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APPLYING THE TRANSTHEORETICAL MODEL OF CHANGE TO STRESS MANAGEMENT AMONG ADOLESCENTS: DEVELOPMENT AND VALIDATION OF DECISIONAL BALANCE AND CONFIDENCE MEASURES

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BY

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Abstract

The negative physical and psychological health consequences of stress are a significant and prevalent concern for our society. This study proposes using the Transtheoretical Model to increase stress management behaviors among adolescents. As a first step in doing so, measures of decisional balance and self-efficacy were developed on a pilot sample of 317 ninth and tenth graders from a public, New England high school. Using a split-half cross-validation procedure, exploratory and confirmatory analyses produced two, internally consistent instruments. The resulting decisional balance measure includes 4 items to measure the pros of practicing stress management and 4 items to measure the cons of the behavior. The self-efficacy measure developed consists of 9 items encompassing a single general factor of confidence. This decisional balance measure offers validation for the Transtheoretical Model. The pros increased significantly across stages of change, while the cons decreased significantly. However, this confidence measure does not imitate past findings. These confidence items remain stable across stage of change. Further studies are needed to determine if this effect is due to the sample or this behavioral area among adolescents. Consistent with the literature, gender comparisons revealed that girls acknowledge more benefits of stress management, whereas boys reflect more confidence to practice stress management. These measures will allow for the study of stress management behavior change among adolescents with sound and reliable instruments.

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Applying the Transtheoretical Model of Change to Stress Management Among Adolescents: Development and Validation of Decisional Balance and Confidence Measures

The negative physical and psychological effects of stress have been recognized and studied for decades. However, it is in recent years that stress as a health and lifestyle problem has received great attention from researchers, medical professionals, psychologists, and the general public. This augmented awareness and promotion of the detrimental effects of stress can be attributed to the increased focus on prevention of chronic illness and maintenance of healthy lifestyles by our society. Emphasis is now placed upon individual health behavior such as stress management techniques, as a critical means to acquiring a healthy lifestyle and preventing chronic illness. In order to understand the importance of consistent stress management it is necessary to review the nature and prevalence of experienced stress.

Cannon (1929) described the physiological experience of stress as the flight or fight response. When an individual experiences potentially dangerous situations the body mobilizes its resources in order to respond and overcome to the stimulus. The physiological reactions includes elevated heart rate and blood pressure, a redistribution of blood flow to major muscle groups and the brain, and a decrease in vegetative functions. It is important to note the subjective factors in the physiological experience of stress. How an individual cognitively appraises and emotionally perceives the experience greatly determines to what extent stress is experienced both physically and psychologically. Thus, the evaluation of an event as stressful is

subjective and hinges upon the balance between the perceived demands and resources of an individual.

Stress has been shown to be associated with an increase in physical and psychological symptoms and to be associated with the onset of illness. It has been shown to clearly affect human immune system and psychological functioning (DeLongis, Folkman, & Lazarus, 1988; Holmes & Rahe, 1967). DeLongis and colleagues examined the relationship between daily stress and two aspects of well-being: physical symptoms and mood. Data were collected from 75 married couples across 20 assessments during a six-month period. The researchers found a significant relationship between daily hassles and the occurrence of both concurrent and subsequent health problems. For most participants, a high score for daily stress was associated with an increase in same day mood disturbances along with an increase in physical symptoms. Other research further indicates that stress impacts disease susceptibility and progression. For example, stress has been associated with outbreaks of the herpes virus. The antibody levels of the herpes virus are related to the overall stress index (Kemeny, Cohen, Zagans, & Conant, 1989). In a more recent study, Cohen, Tyrrel, and Smith (1998) demonstrated a direct relationship between chronic stress and acute respiratory infections. In this study, individuals who experience stress that posed long-term threat developed colds at twice the rate of individuals without such chronic stress.

The relationship between stress and cancer is controversial. Although the exact relationship is ambiguous, it is a commonly held belief that large amounts of stress can hinder the health and functioning of individuals and cause incidences of cancer.

The relationship may be direct, indirect, or a combination of the two. Directly, stress may be associated with the onset of cancer by effects on the neuroendocrine and immunological pathways. Cooper and Faragher (1993) found a relationship between stress events and the incidence of breast cancer in a sample of 2,163 women. It is important to note that it was not the number of stressful events but the perceived severity that was associated with breast cancer. However, there is also evidence that the relationship between stress and cancer may be indirectly mediated by health behaviors. Decreases in healthy behaviors and increases in unhealthy behaviors have been shown to affect cancer incidence and progression (Anderson, Keicolt-Glaser, & Glaser, 1994; Lacks & Morin, 1992). It is believed that decreasing such healthy behaviors as exercise and good diet and increasing unhealthy behaviors such as smoking, sedentary lifestyle, and diets high in fat, can increase stress levels. Prochaska et al. (1988) found that stress caused an increase in cigarette cravings and an increase in the number of cigarettes smoked. Unhealthy behaviors in one's lifestyle can be caused by or lead to increased stress which in turn can initiate or exacerbate a cancer diagnosis.

Stress is a prevalent and costly health concern for our nation. A survey conducted by the National Health Institute found that 30% of employed workers reported that stress was the work condition that most endangered their health (Shilling & Brackbill, 1987). Further, a survey conducted by the Northwestern Mutual Life Insurance Company (1991) found that stress was a significant problem associated with burnout, health problems, and poor work performance for employees. Indeed, percentages of claims for insurance companies that are stress-related have doubled in

recent years (Northwestern Mutual Life Insurance Company, 1991). Companies and businesses experience many costs due to stress experienced by their employees in terms of absenteeism, loss of productivity, and health care consumption (Klink, Blonk, Schene, & Dijk, 2001). Individuals are experiencing great stress and are unaware of how to handle it effectively. Robbins et al. (1998) found that at least 25% of adult populations do not practice effective stress management strategies. Thus, stress becomes a considerable risk for cancer and other chronic illnesses among a significant percentage of the population.

As is noticeable in the preceding sections, much emphasis has been placed upon the experience and effects of stress among adults. Researchers have found that children, specifically adolescents, also experience frequent stress, and further that this stress can be as physically and psychologically taxing on the adolescent as it is for adults (Dumont & Provost, 1999, Greene & Walker, 1997; Greene, Walker, Hickson, & Thompson, 1985; Lohman & Jarvis, 2000; Natvig, Albrektsen, Anderssen, & Qvarnstrom, 1999). The stressors experienced by adolescents are varied. School stress, family stress, and personal stress are all perceived and experienced as important to adolescents. Adolescence is a time of many biological, social, emotional, and cognitive changes. Puberty changes the lives of adolescents on a physical, emotional, and social level. Adolescents begin experiencing some independence from their family and more pressures from their peers. However, it is also important to realize that adolescents, unlike adults, experience many events that they have no control over because they are still dependent upon their family (Swearingen & Cohen, 1985). When these events are negative, they result in more

stress because they are out of the control of the adolescent. Although the stress experienced by adolescents is a bit different than that of adults, it is perceived and experienced similarly to both physically and psychologically.

Dumont (1999) found that stress, particularly daily hassles, is critical and negative to the lives of adolescents. Using the Adolescent Hassles Inventory, Dumont found a high correlation (r=.89) between the frequency and severity of hassles within an adolescent sample. In adult samples this correlation has been found to be low. Thus, the research indicates that adolescents are more disturbed by the frequency of little stressors. They do not appear to differentiate between daily life events and the severity of the events as much as adults do. Given that adolescents feel great stress from even minor events, research should be extended to help these adolescents practice stress management techniques more effectively and consistently.

The effects of stress upon the health of adolescents also have been studied (Natvig, 1999). Natvig examined the association between psychosomatic symptoms and stress induced by school among a sample of Norwegian adolescents. Girls were more likely to report stomaches, headaches, and feeling low. Boys reported headaches, sleepiness, and feeling nervous more often than girls. Adolescents from both groups reported feeling irritable due to stress often. Thus, adolescents are feeling the impact of stress upon their physical and psychological health. Furthermore, Natvig found that with increased degree of school alienation and school distress that there was an increase in the experience of psychosomatic symptoms.

It is important to acknowledge gender differences in the experience of and coping with stress among adolescents. Swearingen and Cohen (1985) examined the

relationship between negative events and psychological distress among seventh and eighth graders. In sum, they found that the number of negative life events was significantly and positively correlated with psychological distress measured by state anxiety, trait anxiety, and depression. Further, they found that girls scored significantly higher than boys on negative events measured by the Junior High Life Experiences Survey and trait anxiety measured by the State-Trait Anxiety Inventory for Children. Thus, girls were not only experiencing more stressful events, they also were experiencing more negative health consequences because of it.

The aforementioned study provides evidence that girls may experience more stress than boys. However, it is well known that boys and girls both experience stress even if the perceived extent of stress is sometimes unequal. The next question is how do girls and boys cope with the stress. This is important to know in order to develop effective interventions to increase stress management behaviors among adolescents. Researchers have found differences in how girls and boys handle the stress they experience (Copeland & Hess, 1995; Frydenberg & Lewis, 1993). Not surprisingly, boys seem to turn to activities and girls seem to turn to others. Frydenberg and Lewis assessed the utilization of several coping behaviors and styles among 673 Australian secondary students. There were 18 coping strategies that included three coping styles, solving the problem, reference to others, and non-productive coping. The results showed that certain strategies were used to a different extent by girls and boys. Boys used physical recreation more than girls, whereas girls used more social support, wishful thinking, and tension reduction strategies than boys.

The results provided by Copeland and Hess (1995) mimic the results of the previously mentioned study. In their sample of 244 ninth grade students, again, girls reported engaging in more social relationships to cope with stress while boys reported using stress reduction activities or diversions. In addition, girls reported to engage in creating change, either in actual or cognitive terms, more frequently than boys. In sum, it appears that boys tend to more often disengage from the stress and engage in a diversion. Girls seem to deal with the stress directly by talking and problem solving. It is important to keep these differences in mind in order to interpret results of research on stress management practices as well as in order to develop effective interventions for both boys and girls.

It has been shown that stress can be detrimental to the health and daily routine and functioning of both adults and adolescents. Stress management techniques have become an important way by which individuals can mediate the effects of stress (Greenberg, 1993; Woolfolk & Lehrer, 1984). Further, at the same time individuals are preventing illness and promoting healthy living. Effective stress management appears to benefit emotional and physical health and should protect against the development and progression of cancers. Thus, increasing this behavior among the general population should allow for healthier lifestyles and fewer instances of illness. As mentioned previously, one such way of increasing stress management among individuals is to use the behavior change framework of the transtheoretical model (TTM). Researchers have studied stress management behaviors using the TTM, but only with adult samples. Researchers have noted the lack of knowledge about stress and stress management among adolescents, as well as the lack of instruments by

which to study this adolescent health area (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). Given the frequent experience and known health consequences of stress among adolescents, the application of the transtheoretical model to the study of stress management behaviors in a sample of adolescents is well justified. In order to begin this endeavor, measurement development will occur in order to assess and intervene upon the targeted behavior. In the current study, the measurement development of decisional balance and confidence were completed. In order to provide an understanding of the research hypotheses, a brief overview of the TTM and its application to stress management behaviors of adult samples follows.

The Transtheoretical Model of Behavior Change

The Development of the TTM

The transtheoretical model of change is used as a way to understand how and when people make a behavior change. With this knowledge one can both predict change and assist people with the behavior change process. Prochaska and DiClemente (1983) developed the model as a way to design therapy and self-help programs for individual behavior change. The proponents of the model realized that formalized treatment programs for smokers often fail and that most people try to and do quit successfully on their own without the help of experts. Given this knowledge it was surprising that several formalized programs existed and that self-change programs were lacking. The process of self-change was not well understood, thus Prochaska and DiClemente desired to study the process of behavior change. In an initial sample of 872 smokers they sought to develop a model of self-change for

smokers and in the process develop an integrative model of change to be applied more broadly. The name "transtheoretical" comes from the fact that they drew upon the suggestions for change proposed by several theories in order to capture the essence of change. They conceptualized the transtheoretical model as a way to understand and assist the process of self-change in more depth and breadth than had been done before. Stages of change, processes, decisional balance, and self-efficacy represent the main constructs of the model. In order to provide an understanding of the model I will review these basic constructs of the stages of change model. In addition, I will describe previous research on the application of the model to stress management among adult samples. Finally, the application of these constructs to stress management among adolescents will be described.

Stages of Change Model

The transtheoretical model is also referred to as the "stages of change" model because the central organizing concept of the model is stage. Using this model, change is conceptualized as a process involving progress through stages. Stage is the temporal dimension to the model exemplifying when change occurs. The model currently incorporates five stages: precontemplation, contemplation, preparation, action, and maintenance. Movement between stages is deemed as either progression (advancing to a later stage) or regression (reverting to earlier stage). It is important to note that individuals usually cycle through the stages several times before terminating the problem behavior.

Individuals in the precontemplation stage are not intending on changing in the near future, usually defined as the next six months. These individuals can wish to

change but they are not seriously considering or intending to change (Prochaska, DiClemente, & Norcross, 1992). Individuals in the precontemplation stage have been described as resistant or unmotivated to change (Velicer et al., 1998). Further, they are characterized as being uninformed, under-informed about consequences of their behavior or demoralized from failed attempts to change.

Individuals in the contemplation stage are intending to change in next six months. At this stage individuals are aware that a problem with their behavior exists and are seriously considering change. They are more aware of the benefits of changing than precontemplators but remain keenly aware of the cons (Velicer et al., 1998). Therefore, they acknowledge the pros but are unsure if they are ready to exert enough energy and time to make the necessary change. The struggle between the pros and cons may remain present for awhile. Thus, contemplators are sometimes referred to as chronic contemplation or procrastinators.

In the preparation stage individuals are intending to take action in the immediate future, usually defined as within the next month (DiClemente, Prochaska, Fairhurst, Velicer, Velasquez & Rossi, 1991). These individuals usually have a plan of action and even may have already made minor adjustments to their behavior. These adjustments may be cognitive and/or behavioral, but the efforts do not meet the criteria for action. Some of these individuals may have made unsuccessful attempts at changing in the past year and are preparing to make the next attempt successful (Prochaska, et al., 1992). Given the diverse circumstances of individuals at this stage, preparation is referred to as a transition stage rather than a stable stage (Grimley, Prochaska, Velicer, Blais, & DiClemente, 1994).

Individuals in the action stage have made an overt modification to the problem behavior under investigation within the last six months (Velicer et al., 1998). They have modified their behavior and whatever else it takes for them to overcome the problem behavior. The period of time that the modification has been instituted ranges from one day to six months (Prochaska, et al., 1992). It is important to note that any observable change in behavior does not constitute action. Specific criteria for the problem behavior must be established and met in order to progress to action. The criteria are observable changes that are sufficient to reduce risk (Velicer et al., 1998). A common mistake is to view action as the only step to change. All of the work pre-action also deserves recognition of its ultimate contribution to change (Prochaska, et al., 1992).

Individuals in the maintenance stage are at work preventing relapse to a pre-action stage. Maintenance is conceptualized as a continuation not an absence of change. Individuals at this stage make less use of processes, have the highest levels of self-efficacy, and are less frequently tempted to relapse (Prochaska & DiClemente, 1984). This stage is defined as at least six months of continuous action (Prochaska, et al., 1992). The goal during this stage is to stabilize the behavior change and avoid relapse. It is important to note that relapse is the rule not the exception. Researchers have found that 85% of smokers relapse back to contemplation or preparation stage (Prochaska & DiClemente, 1984).

The Processes by which People Change

The second major dimension of the transtheoretical model is processes. The processes help to understand how the stage shifts occur (Prochaska, et al., 1992). The

processes of change are ten covert (cognitive or experiential) and overt (behavioral) activities that people use to facilitate change (Prochaska, Velicer, DiClemente, & Fava, 1988). These are independent variables that people need to apply to progress through the stages. Typically, cognitive or experiential processes (consciousness raising, dramatic relief, self-reevaluation, environmental reevaluation, and social liberation) are used primarily in the early stages. Behavioral processes (helping relationships, counter conditioning, contingency management, stimulus control, self-liberation) are most prominent during later stages. Individuals in particular stages use more than one process at a time and use them as a way to take steps toward change. They can be known as insight that is required to complement the behavioral actions. Without these insights, the action will most likely be temporary.

The Decisional Balance of Behavior Change

The construct decisional balance reflects the weighing of the pros and the cons of changing. Decisional balance is one of the dependent or intermediate measures incorporated in the transtheoretical model that help determine when change will occur. This construct is derived from the Janis and Mann (1977) model of decision-making. Janis and Mann proposed their model as a broad way to represent both the cognitive and motivational aspects of human decision-making. Their model included four categories of pros: instrumental gains for self and others, and approval for self and others. In addition, it also included four categories for cons: instrumental costs to self and others, and disapproval from self and others. However, researchers working with the transtheoretical model have not been able to replicate this eight-factor structure. Their consistent findings support a two-factor construct consisting

just of the pros and the cons of behavior change (Prochaska et al., 1994; Velicer et al., 1985).

Most impressive support for the two-factor decisional balance construct of the transtheoretical model arose from a study of the relationship between stage and this construct across 12 problem behavior areas (Prochaska, et al., 1994). This research bolstered the generalizability of the model as well as the integration of decisional balance as a core construct. The results found many consistencies across the different behaviors. In sum, the typical pattern found is that progress from precontemplation to contemplation involves an increase in the evaluation of the pros of changing and progressing from contemplation to action involves a decrease in the cons of changing. These results provide support for commonalities across the 12 studied behaviors. The finding provides strong support for the internal validity of two-factor model of decisional balance.

In a 1994 article, Prochaska identified a mathematical relationship between the two decisional balance constructs and movement across the stages of change. Two principles of progressing from the precontemplation to the action stage were discovered. This insight allows for increased depth of knowledge about self-changers and process. One of the two principles discovered is the strong principle of change. The strong principle suggests that progression from precontemplation to action for a particular behavior is a function of approximately one standard deviation increase in the pros of changing. It is summarized with the following formula:

PC $\Rightarrow$ A = 1 SD $\Uparrow$Pros. The weak principle of change purports that progress from precontemplation to action for a specific behavior corresponds to a .5 SD decrease in the cons of changing. It is summarized by the following formula:

PC $\Rightarrow$ A = .5 SD $\Downarrow$Cons.

Self-Efficacy in Behavior Change

The construct of self-efficacy represents how confident an individual is in a specific situation that they can cope with high-risk situations without relapsing. This construct was adapted from Bandura's self-efficacy theory (Bandura, 1977). Within the transtheoretical model it is represented as either situational confidence or temptation. When self-efficacy is construed as temptation, how tempted an individual is to behave in a particular way in a specific situation is assessed. Self-efficacy is one of the dependent or intermediate measures that help to determine when change will occur (DiClemente, Prochaska, & Gibertini, 1985). Confidence and temptation are both functions across the stages of change but in opposite directions. Situational confidence increases across five stages, while temptation decreases across the five stages (Prochaska et al., 1991).

In 1990, Velicer, DiClemente, Rossi, and Prochaska found support for a hierarchical model of self-efficacy involving first- and second-order factors. Using structure equation modeling on data collected on smoking cessation, they found that a Complex Hierarchical Model provided "very good" fit to the data (GFI = .855). In this model three factors were treated as primary factors. These are positive/social, negative/affective, and habit/addictive. All of these primary factors loaded heavily

on a single-order factor termed "confidence" for confidence inventories and "temptation" for temptation inventories. These results were replicated in the same paper using a separate subject sample and a separate response format. Again, the Complex Hierarchical Model provided best fit to the data (GFI = .906).

Applying the Model to Stress Management

Recently, the transtheoretical model has been applied to stress management behaviors among adults (Evers, Evans, Fava, & Prochaska, 2000; Fava, Norman, Levesque, Redding, Johnson, Evers, & Reich, 1998; Fava, Norman, Redding, Levesque, Evers, & Johnson, 1998; Fava, Robbins, Redding, Norman, Keller, Evers, & Maddock, 2000; Norman, Fava, Levesque, Redding, Johnson, Ever, & Reich, 1997; Riley, Toth, & Fava, 2000; Robins, Fava, Norman, Velicer, Redding, & Levesque, 1998; Velicer, Prochaska, Fava, Norman, & Redding, 1998). The application of stress management among adults is still in the developmental stages. In order to extend this application to a new sample of adolescents, an understanding of what the adult samples have indicated is important.

Staging algorithms are used to measure the stages of change for specific behaviors (Velicer et al., 1998). Researchers who began exploring stress management have refined their initial staging algorithm. This area of study commenced with inquiring about reducing stress. However, in order to define more clearly the staging process the wording of the algorithm has been changed. Currently, participants are asked, "Do you consistently practice stress management in your daily life?" in order to stage them for this behavior (Fava, et al., 2000).

Researchers have examined the staging distribution of stress management behaviors of three adult samples (Robbins, et al., 1998). Robbins et al. found that 70% to 75 % of adults stated that they were in action or maintenance for stress management. There was a small difference in the amount of females (75%) compared to males (70%) in the last two stages. The distribution for the remaining part of the sample (25% to 30%) was 45% in precontemplation, 25% in contemplation, and 30% in preparation. The gender differences within the early three stages were more substantial than within action and maintenance. More males were in precontemplation (55% versus 35%), whereas more females were in contemplation (30% versus 20%) and preparation (35% versus 25%).

The Decisional Balance Inventory has been developed and administered to both a college and an adult sample (Fava, Norman, Levesque, et al., 1998). The pros and cons scales consist of seven items each. A principal components analysis in the sample of college students (n=250) supported a two-component solution (the pros and cons of stress management). Cronbach's coefficient alpha statistic indicated strong reliability with an internal consistency value of .85 for the pros scale and .77 for the cons scale. Further, a confirmatory factor analysis was performed on the adult sample (N=571) and provided support for the two dimensional structure (GFI = .925). The reliability of the measure for this sample was again strong (.86 for the pros scale and .74 for the cons scale). A noticeable shift in attitude among the participants occurred during the transition between precontemplation and contemplation when the pros increased one full standard deviation. This trend supports the previous research with this model as suggested in preceding sections.

The self-efficacy construct has been represented as situational confidence to manage stress. This measure was developed and tested by Norman, et al (1997). A principal components analysis was performed. One single component was found to represent the construct. The measure consisted of 20 items that had an average loading of .71. Internal consistency was evaluated by Cronbach's alpha. The reliability of this measure was remarkably high (.95).

Ten processes of change for stress management have been created to evaluate and promote movement through the stages in respect to stress management (Fava, Norman, Redding, et al., 1998). A 30-item version consists of three items per process resulting in 10 subscales for the processes. Good psychometric properties using Cronbach's alpha for the ten subscales were found. Values ranged from .73 to .87. Further, significant differences on process use by stage of change were been found for eight of the ten processes of change ($p < .05$). These differences accounted for 4% to 11% of the variance in each process. This result is an indication of a medium effect size.

The Rhode Island Stress and Coping Inventory (Fava, Ruggiero, & Grimley, 1998) is a measure of perceived stress and coping. These researchers designed it as a potential outcome measure for stress management. Using a random adult sample of 466 smokers and former smokers exploratory and confirmatory analyses were conducted. The sample was randomly split for the separate analyses. A principal components analysis was performed to explore the structure of the scale. A 12-item scale emerged with a seven-item stress subscale and five-item coping subscale. Coefficient alphas were high for both of the subscales, .85 and .87 respectively. The

second half of the sample was used for confirmatory analyses. The proposed model with a correlated two-factor structure representing stress and coping as separate but overlapping dimensions provided excellent fit. The goodness of fit index was well above the criterion .90 (.961). Sample items from this measure are, "I felt stressed by unexpected events" and "I felt able to cope with stress."

The transtheoretical model is being extended to the study of stress management among adolescents in order to increase knowledge as to what extent adolescents are managing stress in their lives. As part of a large, funded school-based health promotion initiative, the transtheoretical model will be used as a framework for interventions designed to promote healthy behaviors, including stress management, among adolescents. This behavior change effort will further awareness about the health of adolescents as well as help to promote healthier lifestyles among a young population. In order to extend the application of the TTM to the study of stress management among adolescents, measures of the key constructs must be designed and the theoretical relationships between the constructs investigated. In the current study, measures for decisional balance and confidence were developed and validated. In addition, the current study extended empirical testing of the TTM to new research among adolescents.

Research Hypotheses

The aims of the current study were focused on measurement development and initial validation of two constructs of the TTM for stress management behaviors among adolescents. Decisional Balance and Confidence measures were developed and validated as two separate measures. The research hypotheses were as follows:

H1. Two independent decisional balance constructs, the pros and the cons, will exist for stress management behaviors among adolescents (Prochaska et al, 1994).

H2. There will be a crossover pattern with the decisional balance construct so that the cons will be higher than the pros in the precontemplation stage and the opposite will be true at the action stage, with crossover occurring at either the contemplation or preparation stage (Prochaska et al., 1994).

H3. In regards to the decisional balance construct, between precontemplation and action stages the pros will increase and the cons will decrease. Further, the pros will increase more than the cons will decrease (Prochaska, 1994).

H4. There is no explicit conceptual model being hypothesized for confidence. However, it is anticipated that a structure comprising of subscales will emerge once it is explored empirically (Velicer et al, 1990; Rossi & Redding, 2001).

H5. It is hypothesized that the scores for confidence and any subscales will increase across the five stages (Prochaska et al., 1991; Rossi & Redding, 2001).

Method

Participants

Participants were recruited from the ninth and tenth grades at Mt. Hope High School in Bristol, Rhode Island. A total of 357 adolescents completed the survey during their Health class. However, 40 of those were deleted from the sample because the responses were unreasonable. The data was deemed suspicious if more pages were left blank than were completed or if the majority of responses were nonsensical. For example, some surveys had every circle filled. Given the young age of the participants this type of inappropriate and unusable data was expected. The final cleaned data set included 317 participants. The participants were approximately half girls (50.5%) and half boys (48.9%). There were a few more tenth graders (58.7%) than ninth graders (39.7%). Two participants indicated that they were in the twelfth grade. It is uncertain if these students were enrolled in a lower level Health class or if the response was inaccurate. The majority of students were White and not Hispanic (89.3%). Other racial categories that were slightly represented include Black, Puerto Rican, American Indian, Asian, and Bi-racial.

Procedure

This study is part of a large grant received by researchers at the Cancer Prevention Researcher Center at the University of Rhode Island. This research center will be intervening upon six health behaviors in numerous public schools across the state. Institutional Review Board approval was received and the intervention will begin as soon as all measures and interventions are developed. The current study concentrates on stress management, just one subset of the overall grant.

A team of researchers and graduate students generated pilot items for the decisional balance and situational confidence variables during the summer of 2000. These pilot instruments were created mainly for measurement and intervention development purposes. Items for both measures were created with careful attention paid to the age of the targeted sample. Items from previous adult measures and original adolescent items were combined to form the final pilot measures.

These questionnaires were distributed to students at Mt. Hope High School in Bristol, Rhode Island by staff of the Cancer Prevention Research Center in November of 2000. At the same time that these instruments were distributed the students also completed the following: a consent form, a demographic form, staging questions, a measure of processes of change, a behavioral outcome measure, the Rhode Island Stress and Coping Inventory, and a brief section on family involvement with stress management. Only the decisional balance, confidence, staging, and demographic measures that were distributed will be relevant to the proposed study.

Surveys were distributed to as many ninth and tenth grade students as possible that had health education classes during the days of data collection for stress. In order to participate, students were obligated to sign a participation assent form as well as have passive parental consent. At least ten days prior to the pilot testing, all parents or guardians of ninth and tenth graders were sent a letter describing the study and an attached refusal form. If a parent decided that his/her child could not participate in the study, he/she was instructed to sign and return a refusal form in a prepaid return envelope to the Survey Research Center at the University of Rhode Island. If no response was received within ten days, passive consent was assumed.

At the beginning of the pilot survey, the research staff asked all eligible (those whose parents did not refuse their participation) students to sign a Student Participation Agreement. Students were informed about the nature of the study and that there responses would be confidential and anonymous. The completed surveys have been scanned and imported to SPSS version 10.0. Exempt status approval by the Institutional Review Board was gained for this secondary data analysis study. The University of Rhode Island Institutional Review Board reviewed and approved of all study procedures.

Measures

The proposed measurement development study includes pilot versions of two instruments; 1) decisional balance and 2) situational confidence. Measures that are not integral to the analyses of this proposed study will only be described briefly.

Parental Permission for Research: This form informs parents or guardians of the nature of the study and the nature of their child's possible participation in the research. They are given contact information if they desire further information. The parents are instructed to return an attached form to the university if, and only if, they decline their child's participation (see Appendix A).

Students' Assent Form for the Student Study: Participation agreement is outlined in this form. Students are given contact information in case they desire further information. Their signature on the bottom indicates that they have read and understand their involvement, and that they agree to participate (see Appendix B).

Demographics: A set of 5 questions assessed the date of survey completion, and in addition, the age, gender, race/ethnicity, and grade level of students (see Appendix C).

Stages of Change Algorithms: In order to determine the stage of change for participants, two different staging sequences are being tested. In this questionnaire participants are asked a sequence of four questions for two different staging algorithms. Participants are asked how often they consistently manage stress and how effectively they manage stress for particular time periods in order to ascertain their stage (see Appendix D). In addition, participants are asked how much time they typically spend on stress management practices per day.

Decisional Balance: This 34-item questionnaire equally represents pros and cons of stress measurement (see Appendix E). This scale is intended to measure, on a 5 point Likert Scale (1 = not important to 5 = extremely important), how important particular statements are in the decision to manage stress. Examples are "I am a nicer person to be with when I deal with my stress" and "I'm too young to worry about stress."

Situational Confidence: This 30-item questionnaire inquires about confidence, on a 5 point Likert Scale (1 = Not at all Confident to 5 = Extremely Confident), to manage stress in specific situations (see Appendix F). Examples are "When things are not going they way I want" and "When I do poorly on a test."

Other Measures: Process of Change was measured using a 100-item questionnaire that inquires about experiences that can affect the way some people manage their stress (see Appendix G). A 30-item measure was used to indicate the

behaviors that participants use most often in order to manage their stress (see Appendix H). Finally, the Rhode Island Stress and Coping Inventory is a 10-item measure of the perceived stress and coping independent of specific stress situations (see Appendix I).

Results

Sample Characteristics

Slightly more than half of the sample (54%) indicated that they spend some time each day practicing stress management. However, only 27.2% reported that they devote over 15 minutes each day to stress management. Forty-six percent of the adolescents indicated that they do not spend anytime daily practicing stress management behaviors.

Participants were staged into categories specified by the transtheoretical model based on two different staging algorithms. Participants were asked both whether they consistently and effectively practice stress management in their daily life. Two staging algorithms were included in this pilot survey in order to determine which algorithm appeared to best capture how adolescents conceptualize stress management and give consistent results across dependent variables. Participants were staged into the following categories for both consistently and effectively managing stress: precontemplation, contemplation, preparation, action, and maintenance. Given the minute numbers in the contemplation and preparation stages for both algorithms, these two stages were collapsed into one group classified as contemplators. The stage distribution for both algorithms is displayed in Table 1. Two people did not give adequate responses by which they could be staged.

Approximately two-thirds of the sample was staged similarly by both algorithms (N=220). The other one-third of the sample reported that they do not or do not intend to do consistent and effective stress management at the same level.

The staging distributions between gender and grade were examined to determine if there were group differences for those variables across stages. Using consistently manage stress there were no staging distribution differences for boys and girls or for ninth and tenth graders. Using effectively manage stress there were differences for gender in the staging distribution, $\chi^2(3, N=313) = 17.72, p < .001$. In order to determine at which stages gender differences were relevant, 2 X 2 (stage by gender) Chi Square difference tests were performed. The results show that boys were more likely to be in precontemplation [$\chi^2(1, N=313) = 15.06, p < .001$] and that girls were more likely to be in contemplation [$\chi^2(1, N=313) = 5.80, p < .05$] and maintenance [$\chi^2(1, N=313) = 5.83, p < .05$]. No gender differences were found within the action stage [$\chi^2(1, N=313) = .095, p > .05$]. No differences by grade were found using effectively manage stress. Gender and grade frequencies across staging distributions are displayed in Table 2. As stated in preceding sections, no clear answer between which algorithm works best is evident from this data set. Thus, measures will be analyzed across stage using both algorithms.

Measurement Development

Measurement Development for both decisional balance and confidence was conducted in a similar method A general outline of the analyses for both of these constructs will be provided. Following the broad description, the specific analyses

run for each construct will be described in detail. To begin, the sample of 317 students was randomly split in half for exploratory analyses (sample 1) and confirmatory analyses (sample 2). The goal of the exploratory analyses was to study the measurement structure and psychometric properties of the scales and to propose internally consistent scales that captured the essence and breadth of the constructs within the study of stress management behaviors. The objective of the confirmatory analyses was to validate the structure and properties of the measurement models determined by exploratory analyses. Initially, items were analyzed by examining the distributions of the 34 decisional balance items and the 30 confidence items. There were no items with means below two or above four. Further, no skewness or kurtosis statistic was over two. Thus, no items were eliminated because of extremity bias or skewed distributions.

The exploratory measurement analyses were conducted using Horn's parallel analysis (1965) and the minimum average partial (MAP) technique (Velicer, 1976). In addition, structural equation modeling was also performed on the exploratory half of the sample. The number of latent factors for each construct and the number of items for the final version of the surveys were determined during these exploratory analyses. A final set of items was determined by examining the factor loadings of all items and the reliability of the scales with the particular items included. The items that loaded best and gave the scales the best reliability were kept for the final version. It is important to note that item content was also used as a determining factor to keep or delete items once the empirical support for the item was established. Final items that represented the breadth of the construct for adolescents were deemed as

important as the empirical support. Items that loaded poorly (any item with less than .40 loading on the target component), complex items (items that load well on more than one factor), and items that didn't load on their target factor were deleted. In addition, Cronbach's Alpha was calculated using SPSS (version 10) after each run of the principal components analysis in order to determine the reliability and appropriate length of the scale. It was expected that the final version for the Decisional Balance measure would have approximately eight to twelve items. For the Confidence measure approximately three or four items per subscale (if any) was anticipated. The goal of the item deletion and consecutive principal components analyses were to get the most concise and reliable measures. Principal components analyses were performed until a reliable and strong set of items was reached near the targeted length. Finally structural equation modeling using EQS was conducted to provide another test of the exploratory measurement structure determined by principle components analysis (Bentler, 1990).

Confirmatory factor analysis was performed with structural equation modeling on sample two. This analysis was conducted in order to validate the measurement model determined by the exploratory analyses and to determine how well the decisional balance and confidence models fit the data empirically. To accomplish this goal, several criteria were evaluated. A chi-square value was evaluated to determine the goodness-of-fit of the model to the data. Bentler (1990) explains that a model can be deemed a plausible representation of the data when a small Chi Square value compared to the degrees of freedom is obtained. A Chi-Square to degrees of freedom ratio above 5.0 indicates unacceptable large differences

between the model and data. Also, the comparative fit index (CFI) will be evaluated in determining how well the models fit the data. A CFI better than .90 is assumed to provide a good fit for the data (Bentler, 1990). The average absolute standardized residuals value, an index of the discrepancy between the specified model and the data, will be examined. A value of .05 or less is an indication of good model fit.

Alternative model testing also occurred during confirmatory analysis in order to determine whether or not the specified factor structure fits the current data best. For both decisional balance and confidence the following models were tested; the null model (suggests that there are no latent factors), the one-factor model (suggests that there is one single factor), the model representing the number of factors determined uncorrelated (suggests that there are a certain number of factors and that the factors are independent constructs), and finally the model representing the number of factors determined correlated (suggests there are a certain number of factors and that the factors are related constructs). The model for each construct that produced a significantly better Chi Square result than the others was determined to fit the data best. The Chi Square results were compared by simple subtraction of the values and the degrees of freedom and an evaluation of the significance of the results according to a standard Chi Square table.

Decisional Balance

Principle components analysis of the decisional balance scale initially was run using all 34 items. Participants included in the exploratory analyses for decisional balance were deleted listwise and ranged between 129 and 143 adolescents depending on which items were used. According to theory, two factors were expected to

emerge. The first principle component analysis indicated more than two factors by both the MAP rule and parallel analysis. However, the additional factors did not reflect any substantive content nor strong empirical support. Upon further runs, both MAP and parallel analysis agreed upon a two-factor solution. A series of seven PCA's were run in which ultimately 26 items were deleted through the method aforementioned. A final eight-item set four items for both the pro and con scales. These items captured the desired breadth of the construct. Furthermore, factor loadings on the target factor were at least .7, and good internal consistency for the pro and con scales, .8122 and .7662 respectively was demonstrated. The content and factor loadings of the final set of items for the pros and cons are displayed in Table 3. Both factors, after varimax rotation, account together for 62.89% of the total variance. The pros scale accounts for 33.27% of the variance and the cons scale accounts for 29.62% of the variance. Finally, exploratory structural modeling was performed on these eight items to determine how well the data fit the final eight-item, two factor model on sample one. Factor loadings remained good, above .6, and indices of fit reflected good model fit, χ^2 (19, N=143) =57.493, p <.001, CFI = .889, AASR = .0615 (see Figure 1). The exploratory two-factor correlated structural model produced a very small, nonsignificant, negative correlation.

Confirmatory factor analysis was performed on sample 2 using structural equation modeling. Results of the structural modeling produced good factor loadings and excellent model fit, X^2 (19, N=155) =24.225, p > .05, CFI = .978, AASR = .0439 (see Figure 2). As expected when confirming a model structure, coefficient alphas of

the pro and con scales decreased some, .7744 and .6413 respectively. This two-factor correlated model produced a correlation of .263.

Alternative models conceptualizing decisional balance were tested to determine the best model fit for the current data. In order to make-up for the small sample sizes in sample one and sample two and to provide an exhaustive depiction of the empirical support for the models with the given data, the models were tested on sample one, sample two, and the entire data set (sample one and sample two combined). See figure 3 for structural equation modeling results for the entire data set. In Table 4 the results of the four alternative models, the null model, the one-factor model, the two-factor uncorrelated model, and the two-factor correlated model, are displayed for all three samples subsets of the current sample.

The null model is not considered a plausible model. It is used as a comparison for other contending models. For all three sample, it was clear that the one factor model was not fitting the model nearly as well as either of the two-factor models. The chi-square values in comparison to the degrees of freedom was high for the one-factor model. As well, the fit indices revealed poor fit. Thus, chi square difference tests were performed only between the two-factor models. In the exploratory half, the Chi-Square difference test revealed no significant differences between the correlated and uncorrelated two-factor models, X^2 (1, N=143) =.198, p >.05. Thus, the uncorrelated model was assumed the best model for that data because it maintains more parsimony than the correlated model, with less free parameters. In the confirmatory half, the Chi-Square difference test revealed significant differences between the correlated and uncorrelated two-factor models, X^2 (1, N=155) =5.198, p

<.05. Therefore, the two-factor correlated model produced a significantly better fit for the data. Finally, the Chi-Square difference test for the entire data set revealed no significant differences between the correlated and uncorrelated two-factor models, X^2 (1, N=298) =1.708, p >.05. Again, the two-factor correlated model did not produce a significantly better fit.

Confidence

Principle components analysis of the confidence scale initially was run using all 30 items. Participants included in the exploratory analyses for confidence were deleted listwise and ranged between 118 and 123 participants depending on which items were used. It was expected that a hierarchical factor structure would emerge with confidence being the one higher-order factor and subscales representing primary factors. It was hypothesized that confidence would emerge as subscales in three content areas of the construct, health/negative affect, social, and achievement. The first principle component analysis indicated more than two factors by both the MAP rule and parallel analysis. However, the additional factors did not reflect any substantive content nor strong empirical support. Most of the items that comprised the second factor were complex items. Only parallel analysis indicated two factors on the second run. Again, more items that were complex or have poor loadings were removed. On the third run, both MAP and parallel analysis agreed upon a one-factor solution. At this point only seven items had been deleted. The remaining 23 items all had good loadings with the factor (above.5) and resulted in a coefficient alpha of .9431. However, the length of the scale was unnecessarily long. The content of many items overlapped and a shorter version was desired to decrease response burden

on participants. A final principle components analysis was run on nine of the highest loading items that represented the breadth of the construct for this behavioral area. The final nine items set produced factor loadings above .6 and good internal consistently (coefficient Alpha = .8960). The content and factor loadings of the final set of items are displayed in Table 5. The one factor solution accounts for 54.56% of the total variance. Finally, exploratory structural modeling was performed on these nine items to determine how well the data fit the final nine-item, one factor model on sample one (N=123). Factor loadings remained good, above .5, and indices of fit reflected good model fit, X^2 (27, N=123) =53.47, p <.05, CFI = .947, AASR = .0336 (see Figure 4).

Confirmatory factor analysis was performed on sample 2 (N=139) using structural equation modeling. Results of the structural modeling produced good factor loadings and excellent model fit, X^2 (27, N=139) =55.54, p <.05, CFI = .95, AASR = .0358 (see Figure 5). The coefficient alpha remained almost identical, .8911. Although the results indicated a one-factor solution, the breadth of the content in the final confidence items represented the three subscale areas initially sought. Therefore, alternative models for confidence were tested to determine if the one factor model did fit the data significantly better than a three-factor model. Again, in order to make-up for the small sample sizes in sample one and sample two the alternative models were tested on sample one, sample two, and the entire data set. See Figure 6 for results of structural equation modeling on the entire data set. In Table 6 the results of the four alternative models tested, the null model, the one-factor

model, the three-factor uncorrelated model, and the three-factor correlated model, are displayed for all three samples subsets of the current sample.

As mentioned earlier, the null model is not considered a plausible model. It is just used as a comparison for other contending models. For all three sample, the three-factor uncorrelated model showed Chi-Square to degrees of freedom ratios above 5.0 and poor indices of fit. Therefore, Chi-Square significance tests were performed only between the one-factor model and the three-factor correlated model. However, it is imperative to note that the correlations among subscales in the three-factor model were close to or above 1.0. This is an improper solution and an indication of a misspecified model. Significance tests were performed just for presentation of the results because a larger sample may allow for an appropriate, three-factor specified model. In the exploratory half, the Chi-Square difference test revealed a significant difference between the one-factor and three-factor models, χ^2 (3, N=123) =12.70, $p < .05$. The three-factor correlated model was the best fitting model for sample one. However, although the three-factor model produced good fit, it is a misspecificed model that cannot be interpreted as appropriate for this data. In the confirmatory half, the Chi-Square difference test again revealed a significant difference between the one-factor and three-factor model, χ^2 (3, N=139) =7.999, $p < .05$. However, the three-factor model again resulted in an improper solution, with factor correlations above 1.0. The Chi-Square difference test for the entire data set did not reveal significant difference between the one-factor and three-factor model, χ^2 (3, N=262) =2.382, $p > .05$.

Construct Validity

Upon the decisional balance and confidence measures being developed into concise, representative measures, they were examined across the stages of change as a form of construct validity. An Analysis of Variance was conducted to determine if there were significant mean differences in the scores across the stages of change for stress management behaviors. A follow-up Tukey test determined among which stages the differences were found. In order to view the constructs across stages, the sum of the items for each factor were converted to T- scores (M=50, SD=10). Construct validity was assessed across stages for both consistently and effectively managing stress algorithms. Table 7 displays the raw scores and standard deviations for the pros, cons, and confidence across stages of change for effectively and consistently practicing stress management.

Decisional Balance

Across effectively managing stress stages of change, the pros, F (3, 300) = 6.918, $p < .01$, $\eta^2 = .065$, and cons, F (3, 304) = 9.484, $p < .01$, $\eta^2 = .086$, of stress management revealed overall significant differences. Follow-up tukey tests revealed that for pros, precontemplation (M = 47.24) was significantly lower than contemplation (M = 53.85), action (M = 51.55) and maintenance (M =52.1). For cons, precontemplation (M = 52.69) and action (M = 50.97) were significantly higher than maintenance (M = 45.91). A pictorial representation of the pros and cons across stages for effectively managing stress is presented in Figure 7. It is apparent that the pros and cons vary across stage more or less as expected. The pros being

significantly lower than at precontemplation than maintenance and the cons being significantly greater at precontemplation than maintenance is validation for the transtheoretical model using this staging algorithm.

Across consistently managing stress stages of change, the pros, F (3, 299) = 5.97, p <.01, η^2 = .057, and cons, F (3, 303) = 7.58, p <.01, η^2 = .070, of stress management revealed overall significant differences. Follow-up tukey tests revealed among which stages the differences were for the pros and cons scores. For pros, precontemplation (M = 48.42) was significantly lower than contemplation (M = 54.82) and maintenance (M =52.86). For cons, precontemplation (M = 51.67) and contemplation (M = 52.63) were significantly higher than maintenance (M = 45.60). A pictorial representation of the pros and cons across stages for consistently managing stress is presented in Figure 8. The pros being significantly lower than at precontemplation than maintenance and the cons being significantly greater at precontemplation than maintenance is validation for the transtheoretical model.

Confidence

A one-way Analysis of Variance used to examine confidence across stages for effectively managing stress revealed no significant differences across stages in confidence scores, F (3, 260) =1.66, p > .05. A pictorial representation of confidence across effectively managing stress is displayed in Figure 9.

A one-way Analysis of Variance used to examine confidence across stages for consistently managing stress revealed no significant difference across stages in

confidence scores, F (3, 260) = .221, $p > .05$. A pictorial representation of confidence across consistently managing stress is displayed in Figure 10.

Correlations with Demographics and Processes

The validity of the decisional balance and confidence measures were also examined through correlations with demographic variables and correlations with the process of change measure used with the sample.

The correlations with the demographic variables of gender, race, and grade are presented in Table 8. The pros of stress management were significantly related to gender and not with race or grade. The cons of stress management were significantly related to race and grade but not gender. Finally, confidence to manage stress was only significantly correlated with gender.

Construct Validity was further investigated by examining correlations of the pros, cons, and confidence scales with the subscales for the processes of change (see Table 9). The pros of stress management were significantly correlated with all of the process subscales ($p < .01$), whereas the cons of stress management were significantly related only to dramatic relief, $p < .01$. Confidence with stress management was not significantly related to any subscale of the process measure. Included in this table are the correlations of the pros, cons, and confidence with each other and with the stress and coping subscale of the RISC.

Gender Comparisons: Decisional Balance

In Table 10 and Table 11 the raw and T scores with standard deviations for decisional balance across staging algorithms by gender are presented. A two-way (stage X gender) MANOVA was calculated on pros and cons to determine if there

were gender main effects and interaction effects between staging for consistently managing stress and gender on the decisional balance constructs. No interaction effect was found, $F(6, 572) = .718$, $p > .05$. In addition, there was no main effect for gender, $F(2, 286) = 1.96$, $p > .05$. However, there was a significant main effect for stage, $F(6, 572) = 6.38$, $p < .001$, $\eta^2 = .063$. Follow-up ANOVA's indicated that both pros [$F(3, 287) = 4.65$, $p < .05$, $\eta^2 = .046$] and cons [$F(3, 287) = 7.52$, $p < .001$, $\eta^2 = .073$] were significantly different by stage. Follow-up Tukey tests of stage by pros and cons were discussed previously.

A two-way (stage X gender) MANOVA was performed on pros and cons to ascertain if there were interaction effects between staging for effectively managing stress and gender on the decisional balance constructs. Again, no interaction effect was found, $F(6, 574) = .729$, $p > .05$. Main effects for stage and gender did result, $F(6, 574) = 7.20$, $p < .001$, $\eta^2 = .070$ and $F(2, 287) = 3.55$, $p < .05$, $\eta^2 = .024$ respectively. Follow-up ANOVA's indicated that both pros [$F(3, 288) = 4.14$, $p < .01$, $\eta^2 = .041$] and cons [$F(3, 288) = 8.76$, $p < .001$, $\eta^2 = .084$] were significantly different by stage. However, when examining the results by gender, significant differences were only found on the pros scale, $F(1, 288) = 7.11$, $p < .01$, $\eta^2 = .024$. Girls had higher scores ($M = 15.06$, $SD = 3.55$) than boys ($M = 13.55$, $SD = 3.97$) on the pros of managing stress. Follow-up Tukey tests of stage by pros and cons were discussed in a previous section.

Gender Comparisons: Confidence

A two-way (stage X gender) univariate ANOVA was performed on confidence to examine if there were main effects for gender and interaction effects between staging for consistently managing stress and gender on the self-efficacy construct. No interaction effect between stage and gender was found for confidence, $F(3, 251) = 2.56$, $p > .05$. Further, no main effect by stage was found, $F(3, 251) = .187$, $p > .05$. There was a main effect by gender, $F(1, 251) = 5.09$, $p < .05$, $\eta^2 = .020$. Boys had higher confidence ($M = 24.14$, $SD = 7.20$) than girls ($M = 21.48$, $SD = 7.14$) to manage stress.

A two-way (stage X gender) univariate ANOVA was performed on confidence to examine if there were interaction effects between staging for effectively managing stress and gender on the self-efficacy construct. There was no interaction effect between stage and gender for confidence, $F(3, 251) = .398$, $p > .05$. In addition, no main effect by stage was found, $F(3, 251) = .702$, $p > .05$. Again, there was a main effect by gender, $F(1, 251) = 5.75$, $p < .05$, $\eta^2 = .022$. Again, boys had higher confidence ($M = 23.84$, $SD = 7.19$) than girls ($M = 20.93$, $SD = 7.14$) to manage stress.

Discussion

The overall contribution of this study is two, reliable and valid measures for decisional balance and confidence for use among adolescents within the study of stress management. The measures are concise, yet offer a breadth of content and strong reliability. Thus, they are ideal for assessment or intervention purposes. Exploratory and confirmatory analyses were performed using a split-half cross-validation procedure. Across samples, the confirmatory factor analyses indicated a consistent factor structure along with good model fit, factor loadings, and reliability coefficients. Given the larger number of participants included in the entire data set in comparison to the split samples, the models presented on the entire data set probably exemplify the most stable and accurate solutions. The reliability coefficients for the cons were a little weaker than that of pros across the samples. However, this is similar to the decisional balance measure developed for stress management practices among adults (Fava, Norman, Levesque, et al, 1998).

Similar to previous work with the transtheoretical model across several behaviors and samples such as Prochaska et al. (1994), two, independent decisional balance constructs, the pros and the cons, did exist for stress management behaviors among adolescents. Among all three samples a two-factor solution was by far the most appropriate. However, only in the confirmatory sample was a correlation among the pros and cons a significantly better solution than the uncorrelated. In the entire data set, there was essentially no correlation between factors. Larger studies may be able to provide a more stable estimate of the correlation between the pros and cons for this behavior among adolescents.

As was hypothesized, a crossover pattern did occur for decisional balance: the cons were higher than the pros in the precontemplation stage and the opposite was true at the action stage. This pattern occurred for both the consistently and effectively staging algorithm. Again, across both staging algorithms precontemplators significantly differed from maintainers on both the pros and cons. This discriminant validity of these constructs is exemplified by Figures 7 and 8 where the means of the factors are displayed functioning differently across stages of change by both staging algorithms. As theorized by the transtheoretical model, precontemplators in this sample recognize more cons of practicing stress management and fewer pros of doing it than maintainers (Prochaska et al, 1994). Adolescents who consistently or effectively manage stress deemed more positive aspects of the behaviors than negative. In addition to discriminate validity, construct validity of decisional balance measure is evident by the significant correlations of the pros with all of the process items. Participants who reported high importance of the pros of stress management also reported higher process use. These findings reflect the validity of the decisional balance measure as well as affirmative empirical testing of the transtheoretical model to a new behavioral area.

The small and homogenous nature of the sample, especially in regards to stage of change, hampered a clear evaluation of some of the hypotheses. Determining when the crossover between the pros and cons occurred was more difficult than expected. Due to very small numbers in the contemplation and preparation stages, the two stages were collapsed into one stage, contemplation. It was hypothesized, following prior work in this area, that the crossover between pros

and cons across the stages of change would occur at either the contemplation or preparation stage (Prochaska et al, 1994). Given that both of these stages were collapsed in this data set, it is impossible to determine a crossover at contemplation from one at preparation. For consistently managing stress, the intersection of scores is an extended crossover from contemplation to action. Contemplation is the point where the cons drop below the pros but it is not until action that the scores are clearly no longer different. The crossover pattern for effectively occurs between precontemplation and contemplation. The pattern of scores appears to reverse at contemplation, and by contemplation the scores are quite different. The crossover pattern that can be distinguished given the nature of staging is close to the hypothesized result. Thus, using either staging algorithm, by the contemplation/preparation stage the adolescents have begun to evaluation the pros and cons of stress management differently than those in precontemplation. A larger sample that is more varied in stage of change will allow for all five stages and a clearer delineation of the exact crossover point. Further, longitudinal data will allow for a more precise examination of the timing of individual change in the assessment of pros and cons for this behavioral area.

It was also hypothesized that the pros would increase more than the cons decrease. This hypothesis was reflective of the strong and weak principles of progress posited by Prochaska (1994). However, in this sample and with use of either staging algorithm, the pros increase more or less equally to the decrease in cons. The findings with this data set do not show a greater magnitude of increase with the pros of stress management than the decrease in the cons of the behavior. A

less pronounced decrease in cons across stages of change has been found in studies of adoption behaviors in comparison to cessation of behaviors (Marcus, Rakowski, & Rossi, 1992). It has been speculated that because continual effort and time is needed to maintain an adoption of behavior, the disadvantages of doing it may remain despite an increase in perceived advantages and even behavior change (Galavotti et al, 1995). Even though these previous outcomes may account for a smaller decrease in the cons, given the prior findings with the pros, a greater increase was anticipated. It is important to note that the strong and weak principles of change have not yet been examined with adolescent samples. It is quite possible that these principles don't hold the same for adolescents as they do for adult samples. Future research with young people is imperative in order to establish the relative increase and decrease of pros and cons of health behavior change to be expected with adolescent samples.

No explicit conceptual model was hypothesized for confidence. Work in this behavioral area among adults determined a single factor solution to represent confidence (Normal et al, 1997). However, much research in this field across numerous other behaviors such as smoking cessation, exercise adoption, binge drinking, sun exposure and other health behaviors in several samples have found a hierarchical structure for confidence (Rossi & Redding, 2001; Velicer et al, 1990). The items for this pilot survey were not written with any specific subscales in mind, however, a post hoc empirical solution comprising of subscales was investigated. The content of the items represent a breadth of construct for confidence to practice stress management and seemed to logically break into three categories: negative affect/health, social, and achievement. Principal components analysis did not support

such a hierarchical, three-factor subscale solution. Thus, the resulting model is of one general factor of confidence. Structural modeling by the exploratory half, confirmatory half, and entire data set all strongly support the one factor solution with excellent model fit, factor loadings, and reliability coefficients. The final nine items that represent the general factor do denote content from the three subscales that were explored. Items 3, 26, and 29 represent negative affect/health, items 4, 19, and 22 represent social, and items 18, 23, and 30 represent achievement. Exploratory structural modeling was performed on the three-subscale solution, however the factors were too highly correlated to allow for a specified model. Although the output represents good fit, it has to be interpreted in context of the extremely high correlations. The content of the subscales does typify situational differences in confidence for stress management practices. Therefore, it is strongly recommended that a hierarchical structure be tested in other, larger samples to determine if the subscale solution could be empirically supported with other data.

It was further hypothesized that confidence scores would increase across the stages of change. Rossi and Redding (2001) recently presented compelling results on the function of self-efficacy in 25 independent studies across 10 health behaviors. In almost every study across the various behaviors self-efficacy increased in a linear fashion across stages of change. Surprisingly, this finding was not confirmed with the current data set. In fact, there were no significant differences in confidence scores across either the stage of change algorithms used in this study. Confidence scores were basically stable across different stage categories. This outcome is in contrast to much previous research. Interpreting this result leaves more questions than answers.

Do precontemplators report confidence to practice stress management because they don't experience any stress or because they imagine it would be easy to do? Do young people in action and maintenance have lower confidence scores than what would be expected because they don't experience much stress? Perhaps adolescents can manage their stress consistently or effectively without much confidence because they deal with little of it. The application of the transtheoretical model to stress management in general is recent and this is its first use among adolescents. Many of these questions and the stability of the confidence outcome can be determined with consequent research in this area.

This sample did not reflect equal representation across the stages of change by either staging algorithms. Using either algorithm mandated a collapse between contemplation and preparation because of minute numbers in those stages. Precontemplation was overly represented with 56.5 % or 44.4% of the sample in that stage dependent upon the algorithm used. Again, maintenance was another stage with large percentages of adolescents staging into. Dependent on which algorithm is used, either 24.1% or 31.1% of the sample is placed in maintenance. These results are different than work that has been done with stress management among adults. Robbins et al (1998) found that 70% to 75% of their adult sample was in action or maintenance for the behavior using consistently managing as the algorithm. Contrastingly, in this sample action and maintenance stages combined for consistently result in only 46.3% of the sample, much less than the percentage with adults. Using effectively, that percentage dropped to 34.3%. Interestingly, the current sample has more participants in precontemplation than did Robbins et al

(1998) in precontemplation, contemplation, and preparation combined. Thus, there seems to be substantive differences in how consistently adults versus adolescents perceive themselves as managing stress. Is it that adolescents don't see as much value in stress management as adults, thus don't have as high of an intention to do it? Or, is it that adolescents don't have as much stress as adults, thus don't feel the need to practice stress management as much as adults? These are questions that remain and may be most effectively answered with open-ended qualitative responses to determine the context by which adolescents perceive stress and stress management in their lives.

Gender comparisons among the adolescents were investigated to determine if gender or an interaction between stage and gender were meaningfully influencing responses on the pros, cons, and confidence scales. No interaction effects resulted, thus the effects of stage and gender across stage of change combined do not produce a significant difference in scores. When using effectively managing stress as the algorithm, girls scored significantly higher than boys on the pros scale. Thus, girls appear to perceive more benefits of managing stress. This finding follows the results of Copeland and Hess (1995) and Frydenberg and Lewis (1993) that girls report dealing with stress directly such as through problem solving. These studies reported that boys tend to disengage from stress and engage in a diversion to avoid the stress. Whereas, girls talked about their stress with others, engaged in wishful thinking, and practiced tension reduction strategies. It makes logical sense that girls would report more benefit to stress management than boys, when they have noted dealing with it more directly than boys in previous studies.

Using either algorithm produced no stage or interaction of stage and gender effect for confidence. However, a gender effect was found in confidence scores with usage of both consistently and effectively managing stress algorithms. In both cases, boys reported more confidence in practicing stress management than girls. Swearingen and Cohen (1985) found that seventh and eighth grade girls reported not only more stressful events, but also more negative health consequences from stress than boys. Using this study as a guideline, perhaps boys perceive less stress, thus are more confident that they can handle it. Experiencing less stress should make it easier to deal with and allow for more confidence to overcome it effectively or consistently.

Two different staging algorithms were tested with this pilot data sample. Consistently managing stress was the algorithm of choice for work done with adult samples in this area. However, it was decided to try both algorithms with the adolescents to determine which staging worked best for the age group. All of the current analyses were run investigating results based on the use of either algorithm. However, it is beyond the nature of this project to definitely determine which algorithm is best suited for behavior change work with stress management behaviors among adolescents. In comparing algorithms for adult samples, Fava et al (2000) examined the algorithms for sensitivity to stage differences on transtheoretical model variables and several other related variables. The significance and effect size of stage differences were tabulated for each algorithm. The conclusion was that consistent stress management maximized stage of change differences. The work on this study concentrated on only two transtheoretical model variables; decisional balance and confidence. Neither algorithm produced sensitive stage differences for confidence.

However, both algorithms showed sensitivity to stage differences for the decisional balance factors. Further work with this data in comparison to other variables can illuminate which algorithm maximizes stage differences among adolescents.

Some limitations of this study should be noted. The sample size was sufficient for measurement development, but a larger sample would be more conducive to generalizations based on this work especially for validation of the transtheoretical model. Further, this research was based on cross-sectional data. Much survey development is based on such data; however, follow-up longitudinal data would provide stronger support for the measurement development and model validation. With the heavy percentage of people in the precontemplation stage, other stages were not well representative. Collapsing contemplation and preparation limits the interpretability of scales across stage of change. Finally, the majority of the sample was Caucasian. Generalizations to other racial groups must be interpreted with caution. Measurement development of these scales with a more diverse sample would allow for a reliable and valid application to non-White participants.

The work of this study has theoretical and applied implications for the field. Two measures have been developed for use within the study of stress management behaviors among adolescents. This allows for not only further assessment of adolescents within this behavioral area, but also assistance with interventions. The results of this study can guide the development of interventions to increase stress management among adolescents in several ways. Researchers working within this field should be cognizant of group disparities. The results of this study show differential staging patterns among adolescents than that of work based on adults.

The current study shows that adolescents might be less ready to initiate stress management, either consistent or effective, than adults. In addition, gender comparisons reflect differences in how girls and boys perceive the benefits of stress management and confidence to manage stress. Interventions should be focused at increasing the pros of stress management among boys and confidence to do the behavior among girls. The ratio of the pros to cons of the behavior can be used as an indication of readiness of change or stability with change. Precontemplators with high pros in comparison to cons may be quite ready to progress, whereas people in action with low pros in comparison to cons may be at risk for relapse. The results of this project exemplify that the two decisional balance factors are important variables in stage interventions for this area. This ratio of the decisional balance constructs can be quite helpful in gauging the content of tailored messages. Although the general confidence measure developed with this project didn't discriminate by stage, confidence measured by situational differences might. Both the empirical and applied utility of a three-factor hierarchical solution is important and should be addressed in future research. Finally, this work provides validation of the transtheoretical model especially for decisional balance in a new behavioral area for adolescent cohorts.

Table 1

Staging Distribution for Sample by Consistently and Effectively Managing Stress

	Precontemplation	Contemplation	Action	Maintenance
Consistently	178 (56.5%)	29 (9.2%)	32 (10.2%)	76 (24.1%)
Effectively	140 (44.4%)	29 (9.2%)	48 (15.2%)	98 (31.1%)

Table 2

Gender and Grade by Staging Distribution

		Precontemplation	Contemplation	Action	Maintenance
Consistently					
Gender					
	Male	98 (31.3%)	11 (3.5%)	14 (4.5%)	30 (9.6%)
	Female	79 (25.2%)	18 (5.8%)	17 (5.4%)	46 (14.7%)
Grade					
	Ninth	77 (24.7%)	13 (4.2%)	12 (3.8%)	24 (7.7%)
	Tenth	97 (31.1%)	16 (5.1%)	20 (6.4%)	51 (16.3%)
Effectively					
Gender*					
	Male	85 (27.2%)	8 (2.6%)	22 (7.0%)	38 (12.1%)
	Female	54 (17.3%)	21 (6.7%)	25 (8.0%)	60 (19.2%)
Grade					
	Ninth	62 (19.9%)	9 (2.9%)	23 (7.4%)	32 (10.3%)
	Tenth	74 (23.7%)	20 (6.4%)	24 (7.7%)	66 (21.2%)

Note. * $\chi^2(3, N=313) = 17.72$, $p < .001$.

Table 3

Exploratory Factor Loadings and Reliability Analysis for Decisional Balance

Pros of Stress Management *	Pro Loading	Con Loading
I can concentrate better in class when I am less stressed.	.835	.034
I feel healthier when I manage my stress.	.801	.112
It is easier to deal with my parents and family when I am less stressed.	.777	.038
I would be a more pleasant person if I managed the stress in my life.	.769	.065
Cons of Stress Management **		
I don't see any benefits to managing my stress.	.171	.808
I would be ashamed to seek help from others to manage my stress.	.002	.764
Efforts to manage my stress would be disruptive to my daily life.	.082	.762
I'll find out that I can't manage my stress.	.304	.730

Note. * Coefficient Alpha = .8122
** Coefficient Alpha = .7662

Table 4

Results of Decisional Balance Alternative Model Testing

Exploratory	Chi-Square	df	CFI	AASR
Null Model	375.017	28		
1 Factor	114.552	20	.728	.4409
2-Factor Uncorrelated	57.691	20	.891	.0634
2-Factor Correlated	57.493	19	.889	.0615

Confirmatory	Chi-Square	df	CFI	AASR
Null Model	260.423	28		
1 Factor	64.559	20	.808	.3095
2-Factor Uncorrelated	29.423	20	.959	.0564
2-Factor Correlated	24.225	19	.978	.0439

Entire Data Set	Chi-Square	df	CFI	AASR
Null Model	594.775	28		
1 Factor	152.376	20	.766	.3739
2-Factor Uncorrelated	57.325	20	.934	.0483
2-Factor Correlated	55.617	19	.935	.0477

Table 5

Exploratory Factor Loadings and Reliability Analysis for Confidence

Confidence with Stress Management	Loading
When I am in poor health.	.629
When I have an argument with a friend.	.623
When I do poorly on a test.	.705
When my emotional needs are not being met.	.756
When I am treated unfairly.	.714
When I think about failure.	.776
When I am feeling sad.	.812
When I am not able to handle negative feelings.	.788
When I don't know how to solve a personal problem.	.817

Note. Coefficient Alpha = .8945

Table 6

Results of Confidence Alternative Model Testing

Exploratory				
	Chi-Square	df	CFI	AASR
Null Model	538.393	36		
1 Factor	53.474	27	.947	.0336
3-Factor Uncorrelated	306.178	27	.444	.2954
3-Factor Correlated	40.774	24	.967	.0324
Confirmatory				
	Chi-Square	df	CFI	AASR
Null Model	607.662	36		
1 Factor	55.537	27	.950	.0358
3-Factor Uncorrelated	305.915	27	.512	.2867
3-Factor Correlated	47.538	24	.959	.0328
Entire Data Set				
	Chi-Square	df	CFI	AASR
Null Model	1103.885	36		
1 Factor	59.479	27	.970	.0267
3-Factor Uncorrelated	583.311	27	.479	.2931
3-Factor Correlated	57.097	24	.969	.0267

Table 7

Means and Standard Deviations Across Stages of Change

	Precontemplation	Contemplation	Action	Maintenance
Consistently				
Pros	13.34 (4.07)	15.85 (3.25)	13.29 (3.54)	15.08 (3.48)
Cons	9.91 (3.57)	10.25 (3.62)	8.78 (3.39)	7.75 (3.08)
Confidence	23.09 (7.74)	22.56 (7.47)	22.76 (5.75)	22.25 (6.72)
Effectively				
Pros	12.88 (4.05)	15.46 (3.48)	14.56 (3.59)	14.78 (3.60)
Cons	10.27 (3.62)	8.93 (3.54)	9.66 (3.81)	7.86 (2.79)
Confidence	23.26 (7.54)	19.78 (5.02)	22.20 (6.80)	23.21 (7.44)

Table 8

Correlations of Measures by Gender, Race, and Grade.

Measure	Gender	Race	Grade
Pros of Stress Management	-.217**	-.047	.029
Cons of Stress Management	-.025	-.149**	-.145*
Confidence to Manage Stress	.228**	.010	.014

Note. ** Correlation is significant at the 0.01 level.
* Correlation is significant at the 0.05 level.

Table 9

Correlations of Measures With Each Other, Process Subscales, and RISC Subscales

	Pros of Stress Management	Cons of Stress Management	Confidence with Stress Management
Pros	1.00	.121	.027
Cons	.121	1.00	.068
Confidence	.027	.068	1.00
Consciousness Raising	.402*	.033	.012
Dramatic Relief	.415*	.151*	-.081
Social liberation	.378*	.068	.070
Self Re-evaluation	.551*	.008	.025
Environmental Re-evaluation	.477*	.090	-.033
Self Liberation	.454*	-.007	.094
Counter Conditioning	.447*	-.002	.102
Stimulus Control	.409*	.081	.099
Reinforcement Management	.365*	.076	.121
Helping Relationships	.380*	-.101	.001
RISC (Stress)	.295*	.173*	-.043
RISC (Coping)	.305*	-.178*	.321*

Note. * Correlation is significant at the .01 level.

Table 10

Decisional Balance Raw Scores by Gender

		Precontemplation	Contemplation	Action	Maintenance
Consistently					
Girls					
	Pros	14.45 (3.76)	16.06 (3.82)	13.35 (4.04)	15.58 (3.27)
	Cons	10.35 (3.42)	10.17 (3.61)	8.29 (3.75)	7.46 (3.17)
Boys					
	Pros	12.51 (4.14)	15.44 (1.88)	12.92 (2.87)	14.35 (3.69)
	Cons	9.54 (3.68)	10.88 (3.92)	9.15 (2.99)	8.04 (2.79)
Effectively					
Girls					
	Pros	13.96 (3.75)	16.00 (3.63)	15.25 (3.66)	15.02 (3.66)
	Cons	10.82 (3.28)	8.81 (3.50)	10.08 (4.50)	7.67 (2.83)
Boys					
	Pros	12.23 (4.15)	13.86 (2.54)	13.67 (3.45)	14.46 (3.51)
	Cons	9.88 (3.83)	9.71 (3.95)	9.09 (2.96)	8.11 (2.72)

Table 11

Decisional Balance T Scores by Gender

		Precontemplation	Contemplation	Action	Maintenance
Consistently					
Girls					
	Pros	52.03 (8.66)	54.89 (9.88)	49.08 (10.63)	54.29 (8.55)
	Cons	52.89 (9.65)	53.16 (10.02)	47.05 (11.28)	45.36 (9.07)
Boys					
	Pros	46.01 (10.74)	53.94 (5.12)	46.90 (8.83)	51.81 (8.42)
	Cons	50.06 (9.96)	54.74 (11.75)	47.00 (7.02)	46.42 (8.03)
Effectively					
Girls					
	Pros	50.64 (9.08)	54.65 (9.63)	54.19 (9.330	53.22 (8.71)
	Cons	53.89 (9.53)	49.74 (9.92)	52.77 (13.21)	45.68 (7.97)
Boys					
	Pros	45.69 (10.61)	50.10 (6.52)	48.92 (10.83)	51.59 (8.27)
	Cons	50.26 (10.41)	55.87 (9.25)	49.11 (8.83)	46.84 (7.67)

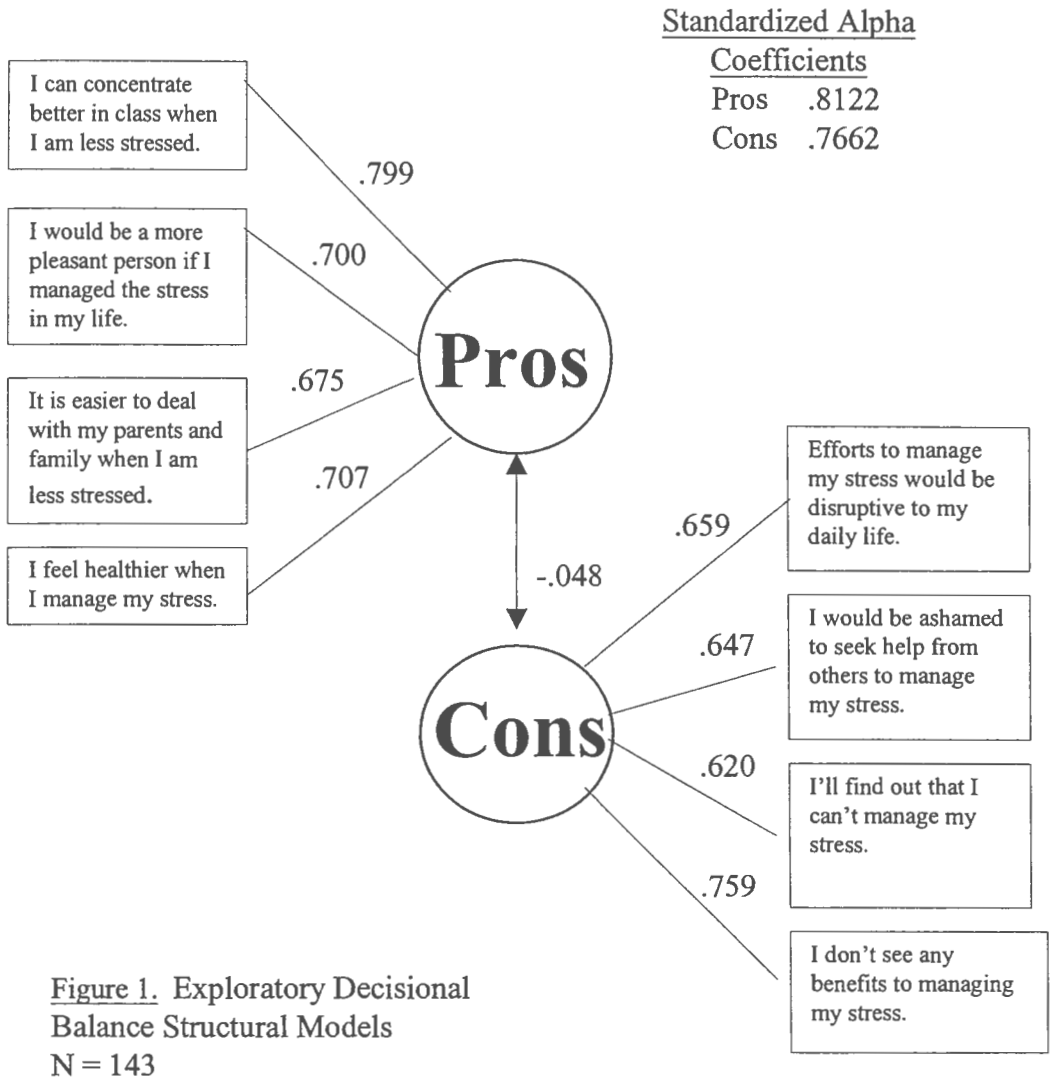

Figure 1. Exploratory Decisional Balance Structural Models
N = 143

Indices of Fit

$\chi^2(19) = 57.493, p < .001$
AASR = .0615
CFI = .889

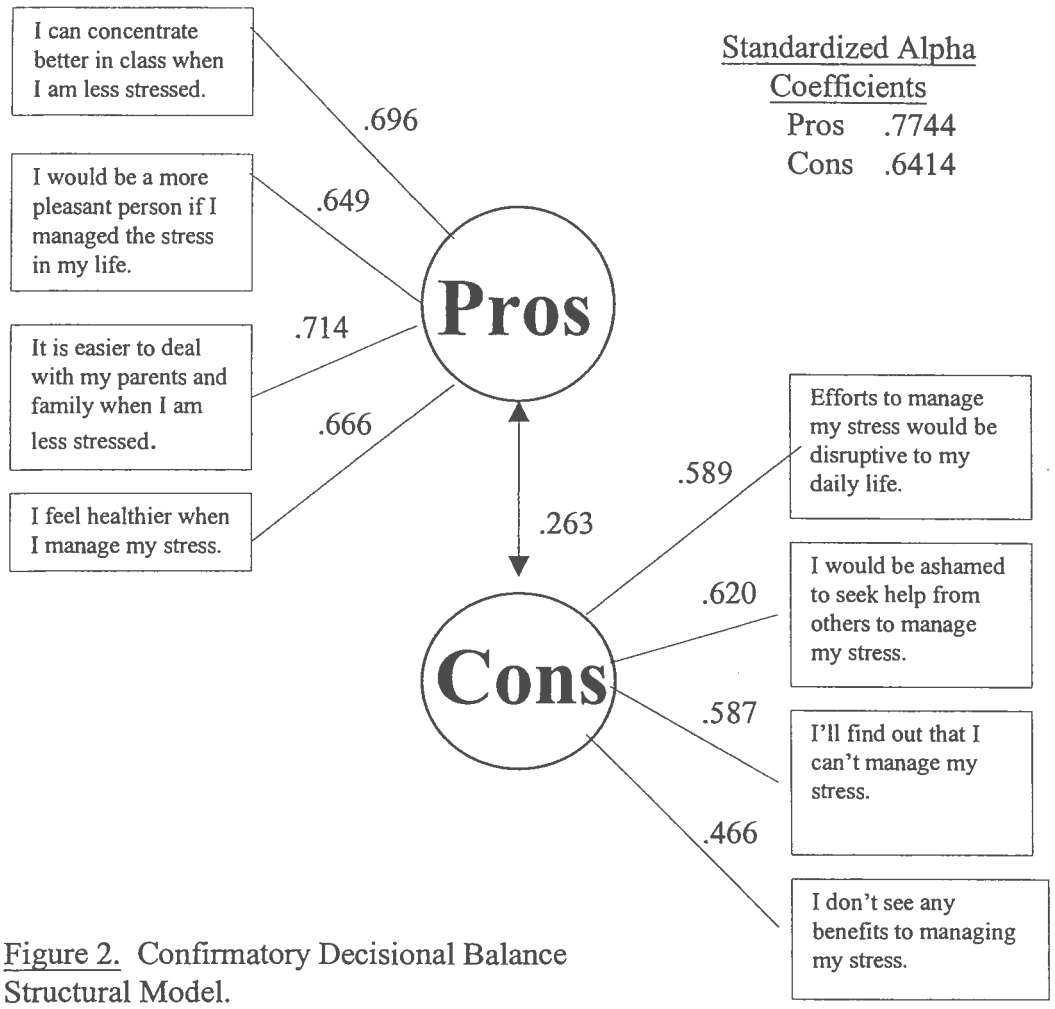

Figure 2. Confirmatory Decisional Balance Structural Model.
N=155

Indices of Fit
χ^2 (19) = 24.225, p > .10.
AASR = .0439
CFI = .978

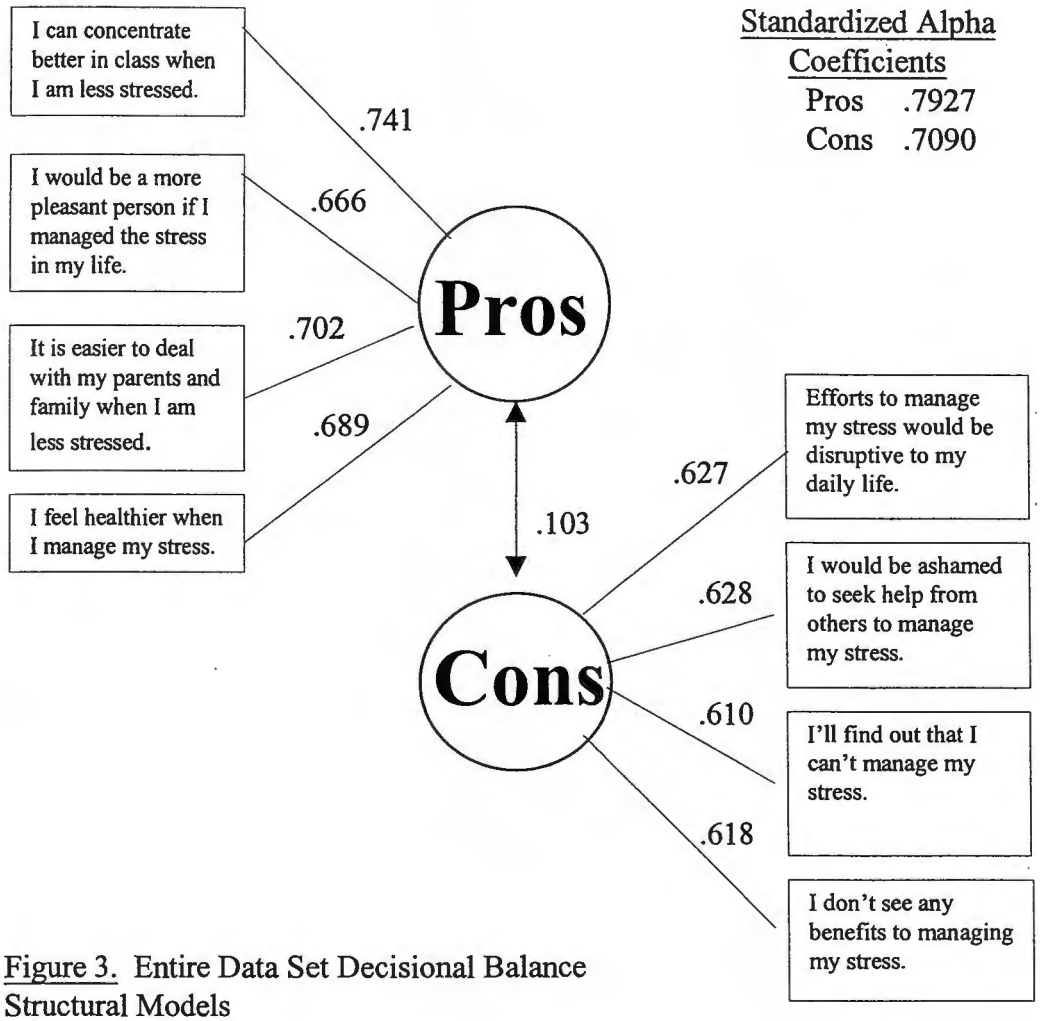

Figure 3. Entire Data Set Decisional Balance Structural Models
N=298

Indices of Fit
χ^2 (19) = 55.617, p < .001
AASR = .0477
CFI = .935

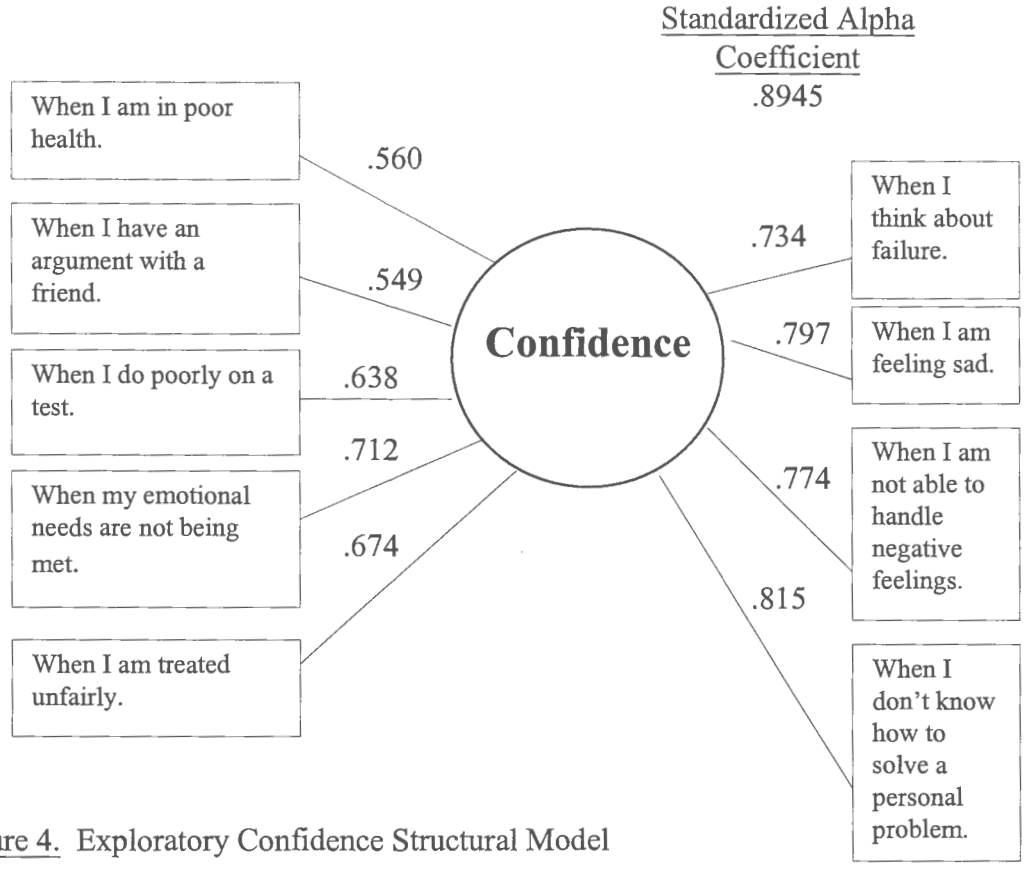

Figure 4. Exploratory Confidence Structural Model

N = 123

Indices of Fit

χ^2 (27) = 53.47, $p < .05$
AASR = .0336
CFI = .947

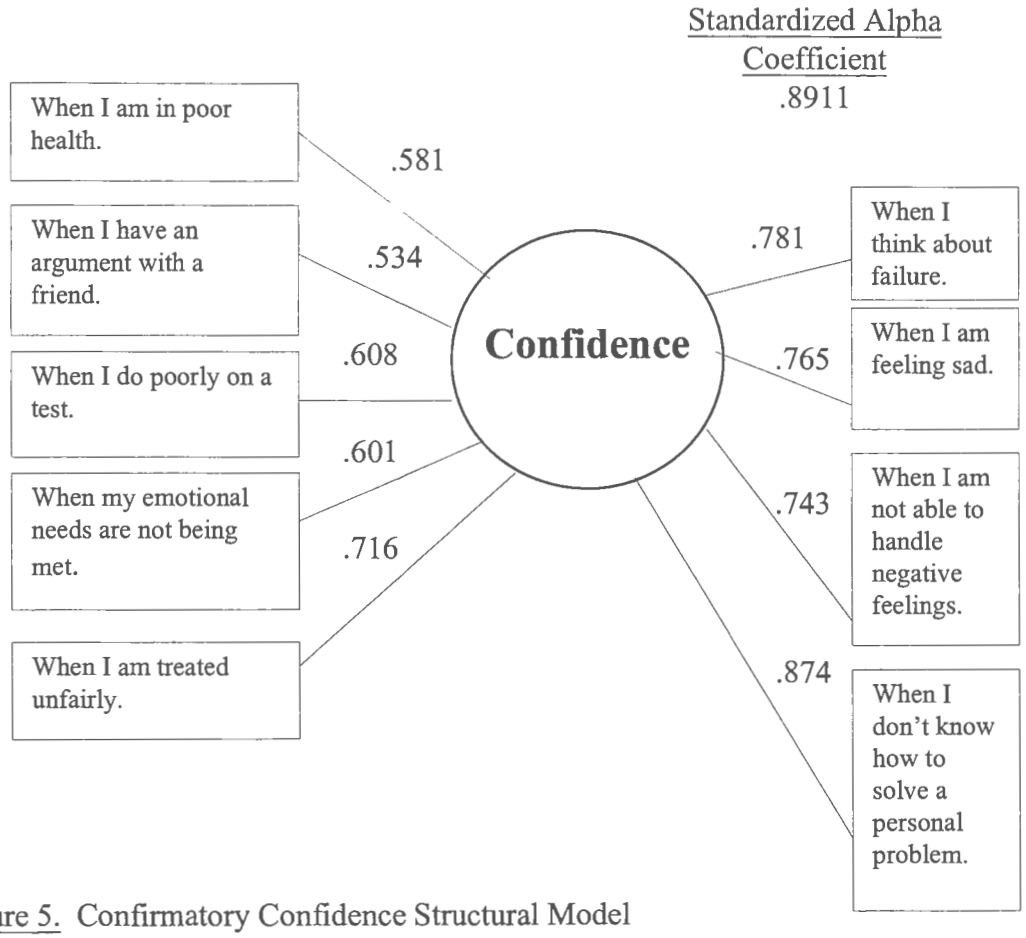

Figure 5. Confirmatory Confidence Structural Model

N = 139

Indices of Fit

χ^2 (27) = 55.54, $p < .05$
AASR = .0358
CFI = .95

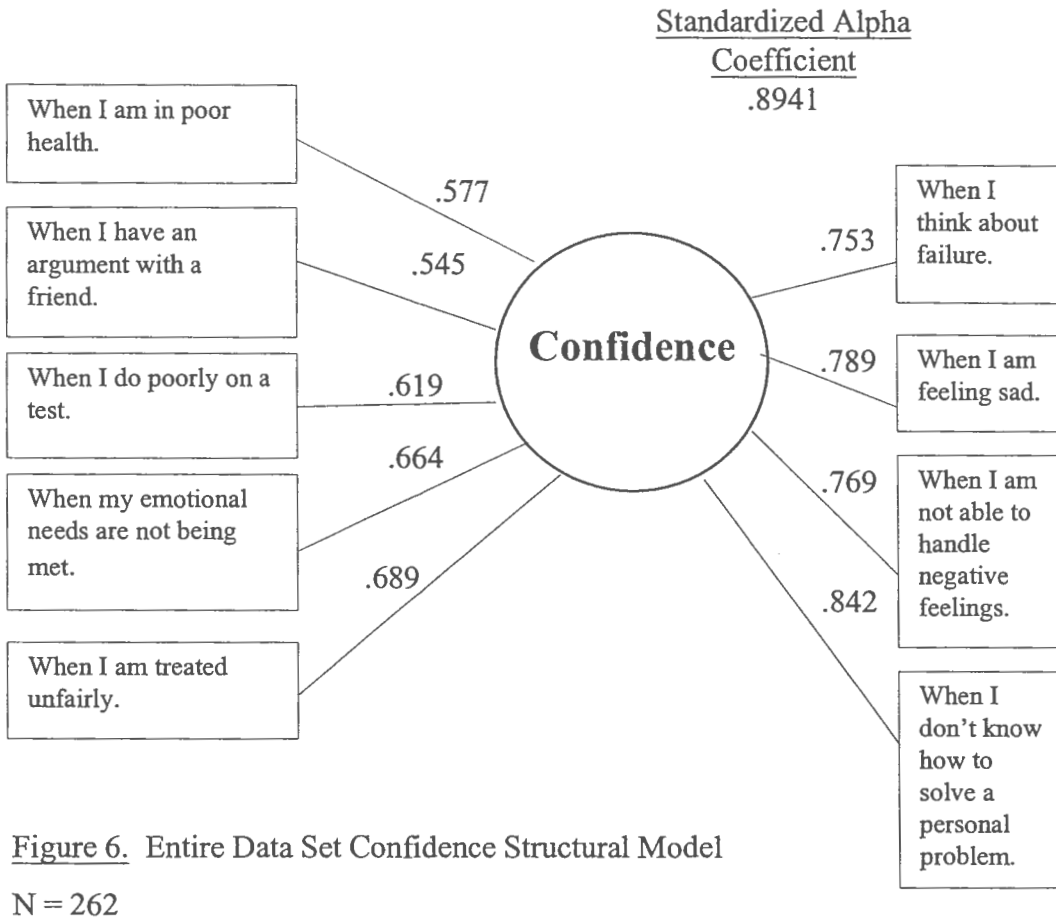

Figure 6. Entire Data Set Confidence Structural Model

N = 262

Indices of Fit

χ^2 (27) = 59.48, p <.05
AASR = .0267
CFI = .97

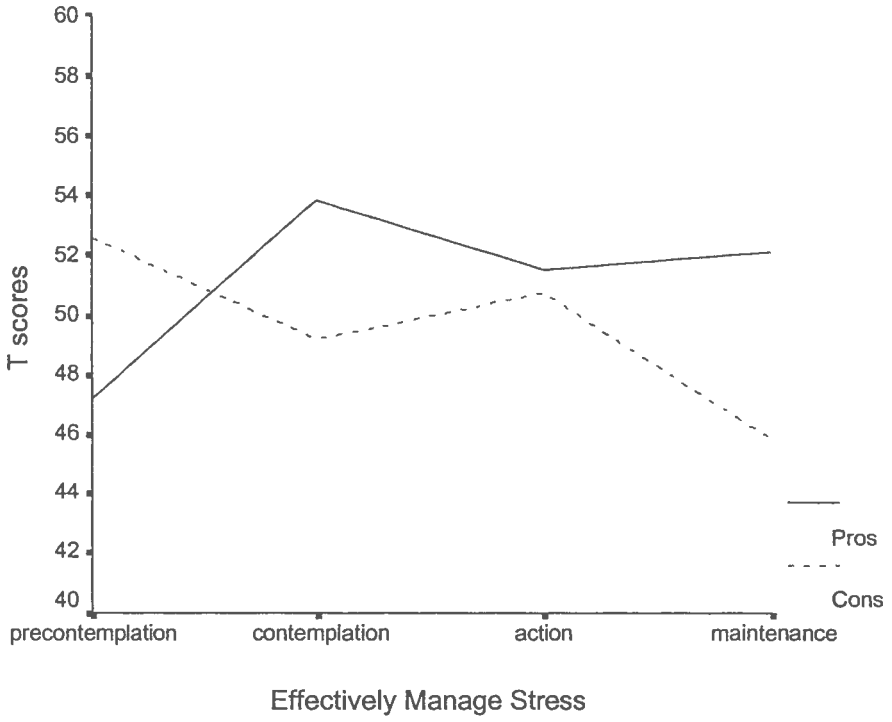

Figure 7. Pros and Cons Across Effectively Manage Stress

Pros: PC < C, A, M

Cons: PC, A > M

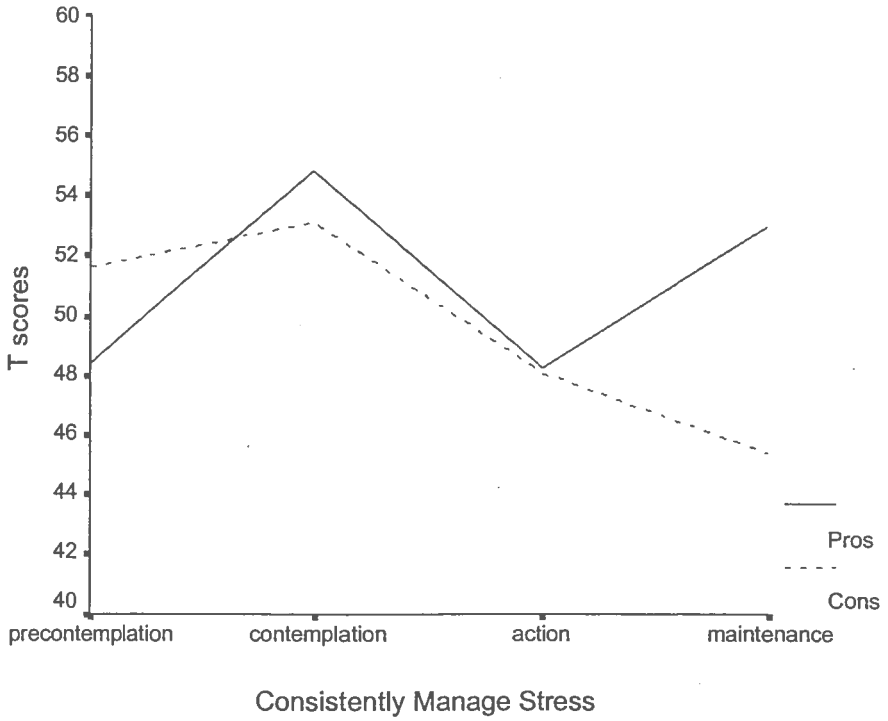

Figure 8: Pros and Cons Across Consistently Manage Stress

Pros: PC < C, M

Cons: PC, C > M

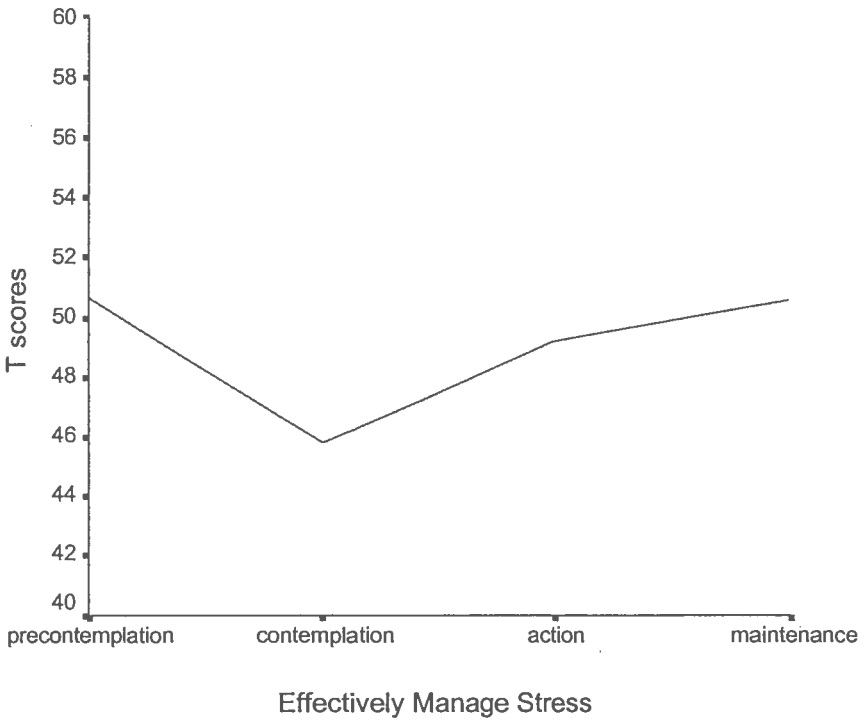

Figure 9: Confidence Across Effectively Manage Stress

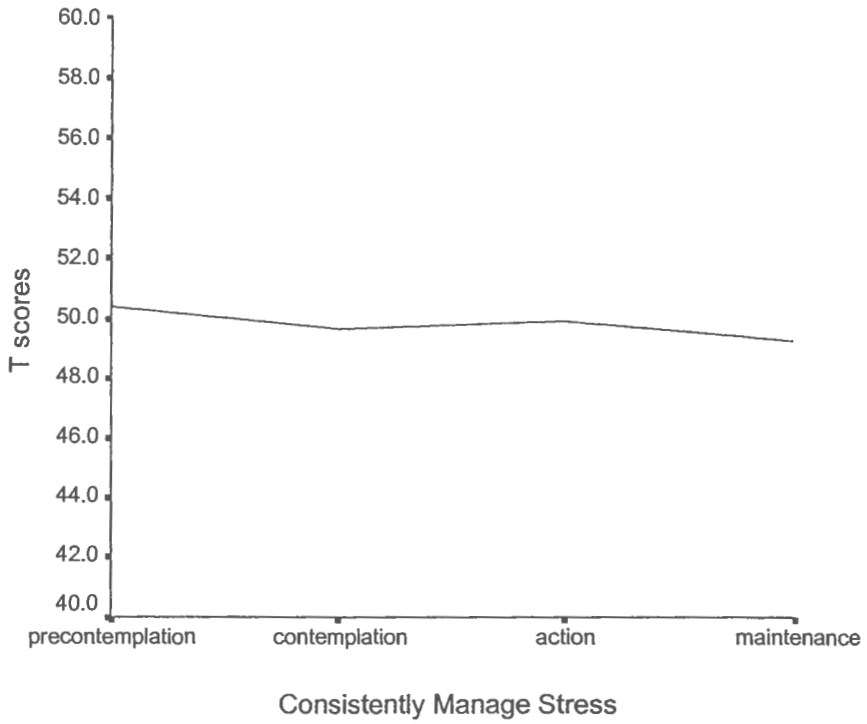

Figure 10: Confidence Across Consistently Manage Stress

Appendix A

Parental Permission Form

The University of Rhode Island
Cancer Prevention Research Center
2 Chafee Road
Kingston, Rhode Island 02881

Title of the Project: School Computer Programs for Teen for Six Cancer Risks

PARENTAL PERMISSION FOR RESEARCH

Dear Parent/Guardian:

I am asking you to allow your child to take part in a research project. It is fully funded by the National Cancer Institute. Your child's school supports and is cooperating with this project. The project is called: "School Computer Programs for Teen for Six Cancer Risks." The project teaches your child and his/her classmates skills to reduce their future risks for cancer and other chronic diseases. The project will educate students in two ways. Some students will be taught how to select low fat foods, how to avoid harmful sun exposure, and how to avoid smoking. Other students will be taught how to handle stress, avoid high-risk alcohol use, and exercise regularly. Which intervention your child will receive will be decided at random. The University of Rhode Island Institutional Review Board, which protects study participants' rights, has approved this study.

If you agree, your child, along with other students in his/her grade, will be asked to take part in a 30-minute survey in grade 9. After the survey, your child will be asked to use a personal computer three times in grade 9 and three times in grade 10. The computer has been programmed to educate your child about healthier lifestyles. The computer could address diet, smoking, and sun exposure or stress, drinking, and exercise. The computer considers the child's specific situation each time and provides him/her with scientifically tested expert advice. Advice is presented through a multimedia program. Additional surveys will be conducted annually in grades 10, 11, and 12. The surveys measure changes in health behaviors over time. If the project staff is unable to contact your child at school after the first survey, the staff will mail the survey with a post-paid return envelope to your home. If he/she does not return the survey, project staff will try to interview your child by phone.

All research activities are done with the cooperation of your child's health education teacher in your child's school. For research reasons only, your child will be asked to write his/her name on the surveys and to identify him/herself while using the computer or during a potential phone survey. All information collected from your child will be strictly confidential. Only authorized staff can access data. Project researchers will use code numbers instead of names. Teachers, other school staff, or the public do not have access to your child's data. We will make every effort to protect your child's data to the fullest extent of the law. We have also obtained a Certificate of Confidentiality from the Department of Health and Human Services (DHHS), which provides the best legal protection possible for research data. This certificate does not represent an endorsement of the DHHS.

Before the study begins, your child will be asked in writing whether he/she wants to be in the study. He/she will receive a written description of the project, the confidentiality of all data, and his/her rights. Your child has the right to refuse to answer any question, to use a computer or to

be in the project at all. If your child chooses not to be in this project, it will have no effect on your child's school program, grades, or other activities.

There are no known risks involved in this project. Your child could benefit from learning about health risk behaviors and adopting a healthier lifestyle. Your child's involvement in this project will provide valuable information to improve health education for all youth.

If you do <u>not</u> want your child to take part in this project, please fill in the information at the bottom of this page. Please sign and return this part of the letter to: **Adolescent Cancer Prevention Project, P.O. Box 10, Kingston, RI 02881-9955,** *within 10 days or contact your child's school. The addressed envelope provided does not need a stamp. We will assume that you are allowing your child to take part in the study if you do not return this letter or contact your child's school within 10 days.*

I will be happy to discuss the program with you and answer any questions you might have. You can call me from 9-4 at (401) 874-2830 or 874-4251.

If this study causes your child any harm, you should write or call the Office of the Vice Provost for Graduate Studies, Research and Outreach, 70 Lower College Road, University of Rhode Island, Kingston 02881, phone (401) 874-2635.

Sincerely,

James O. Prochaska, Ph.D.
Professor and Director
Principal Investigator

✂----------✂----------✂

My child _____ who is in grade _____
Please print your child's full name Grade

is <u>NOT</u> allowed to participate in the School-Based Cancer Prevention Program for Adolescents project.

X _____
Signature of Parent/Guardian

_____ Date:_____
Typed/Printed Name of Parent/Guardian

Appendix B

Student Assent Form

The University of Rhode Island
Cancer Prevention Research Center
2 Chafee Road
Kingston, Rhode Island 02881

Title of Project: School Computer Programs for Six Cancer Risks

PARTICIPATION AGREEMENT

You understand that:

1. The purpose of this research is to learn more about ways to help young people reduce their cancer risks. This project will deal with six major cancer risks. You may work with diet, smoking, and sun exposure or, with stress, alcohol use, and exercise.

2. During grades 9, 10, 11, and 12, you will be asked to do a 30-minute paper-and-pencil survey in school about all six cancer risk behaviors. You will be asked to write your name on the survey. If the project staff does not reach you at school, the survey will be mailed to your home. If you do not return the survey by mail, the project staff will call you at home to do the survey. We will make every effort to protect your privacy during any phone calls.

3. You will also be asked to attend six 25-30-minute class sessions where you will use a personal computer. Three of the sessions will be in grade 9 and three in grade 10. The computer will ask questions about your cancer risks, health knowledge, attitudes, and opinions. The computer will then give you information about how you can reduce your personal cancer risk.

4. All information about you will be strictly confidential. Only the project staff will know your answers. They will protect the confidentiality of your data to the fullest extent of the law. Whenever possible, we will use code numbers in place of your name. You can refuse to participate. You can also leave parts or the entire survey blank without penalty. You can refuse to use the computer or answer questions on the telephone. You can skip all or part of the computer session. If you refuse to participate in this project, it will have no effect on your school program, grade, or other activities.

5. This study could help you make better decisions about your health. Your honest answers are important. They will help design health education programs, which may benefit others in the future.

6. If you have questions about the project, you may contact Dr. James O. Prochaska or project staff at the University of Rhode Island from 9-4 at (401) 874-2830 or (401) 874-4251.

7. If this study causes you any harm, you should write or call the Office of the Vice Provost for Graduate Studies, Research and Outreach, 70 Lower College Road, University of Rhode Island, Kingston, RI 02881, phone (401) 874-2635.

I have read this form. My questions have been answered. My signature below means that I understand this information. I agree to participate in this study.

_____	_____
Signature of Participant	Signature of Researcher/Staff Member
_____	_____
Typed/Printed Name	Typed/Printed Name
_____	_____
Date	Date

Appendix C

Demographic Form

S P S B L T

«cprcid»

Demographics

Today's date: ☐☐ Month ☐☐ Day 20☐☐ Year

Your date of birth: ☐☐ Month 19☐☐ Year

Gender:

- ○ Female
- ○ Male

Choose the category which best describes you:

- ○ White (not Hispanic)
- ○ Black (not Hispanic)
- ○ Puerto Rican, Cuban, Mexican/Mexicano, Mexican-American, Chicano, other Latin American, other Spanish or Hispanic
- ○ American Indian, Eskimo or Aleut
- ○ Asian or Pacific Islander
- ○ Other racial or ethnic group – please specify:

☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Which grade are you in?

- ○ 9th grade
- ○ 10th grade
- ○ 11th grade
- ○ 12th grade

Appendix D

Introduction and Staging Algorithms

Stress is a part of our every day lives. Some of the physical symptoms of stress include feeling nervous or irritable, getting a headache or upset stomach, and having trouble sleeping at night.

There are many different things that can make us feel stressed out. Stress can be caused by something we would rather avoid, like taking a test. Stress can lead to situations we wished had never happened, like getting into an argument with a friend or our parents. Stress can even be caused by things that make us excited and happy, like winning a contest or an award.

Although we usually can't get rid of the stress in our lives, we can learn to manage it. Learning ways to manage stress can help us feel more confident and more in control of our lives when we find ourselves in a stressful situation. Some of the most common ways to manage stress are:

- Talking with others about our problems.
- Having regular quiet time to reflect on our daily activities.
- Playing sports for fun.
- Listening to relaxing music.
- Making time for social activities with our friends.

Consistently practicing stress management means that you spend a part of each day specifically doing activities that help you to deal with your daily stress.

1. Do you **consistently** practice stress management in your daily life?
   (If **YES** skip to question 4)

2. Do you intend to **consistently** practice stress management in the next 6 months?
   (If **NO** skip to question 5)

3. Do you intend to **consistently** practice stress management in the next 30 days?
   (Go to question 5)

4. Have you **consistently** practiced stress management for more than six months?

Effectively practicing stress management means that you successfully deal with the stress in your daily life.

5. Do you **effectively** practice stress management in your daily life?
   (If **YES** skip to question 8)

6. Do you intend to **effectively** practice stress management in the next 6 months?
   (If **NO** skip to question 9)

7. Do you intend to **effectively** practice stress management in the next 30 days?
   (Go to question 9)

8. Have you **effectively** practiced stress management for more than six months?

9. About how many minutes do you spend each day practicing stress management?
   a.) None
   b.) 1 to 15
   c.) 16 to 30
   d.) 31 to 60
   e.) more than 60

Appendix E

A Decisional Balance Measure for Stress Management Among Adolescents

PROS AND CONS OF STRESS MANAGEMENT

The following statements represent different opinions about stress. Please rate how important each statement is to your decision to manage stress according to the following scale:

1 = NOT IMPORTANT
2 = SLIGHTLY IMPORTANT
3 = MODERATELY IMPORTANT
4 = VERY IMPORTANT
5 = EXTREMELY IMPORTANT

How **important** are the following statements in your decision to manage stress?

1. I am a nicer person to be with when I deal with my stress.
2. Dealing with stress would take too much time.
3. I feel like I am in control when I am less stressed.
4. I enjoy a driven lifestyle.
5. Stress is hazardous to my physical and psychological health.
6. It takes too much effort to deal with stress.
7. I would be a better worker if I dealt with my stress better.
8. Stress helps me to concentrate and do better work.
9. I would enjoy life more if I could manage my stress.
10. I don't know how to manage stress.
11. Reducing my stress is good for my health.
12. Managing my stress would take too much time.
13. Stress makes me irritable and unpleasant to be around.
14. I might fail if I try to deal with my stress.
15. My friends and family like me more when I am less stressed.
16. I get more done when I am stressed.
17. My relationships with others would improve if I could manage the stress in my life.
18. I'm too young to worry about stress.
19. I can concentrate better in class when I am less stressed.
20. Feeling stressed is the only way I meet my deadlines.
21. Managing my stress would allow me to be more effective in working toward important goals in my life.
22. It's hard to deal with stress.
23. I get better grades when I am less stressed.
24. Efforts to manage my stress would be disruptive to my daily life

25. I would be a more pleasant person if I managed the stress in my life.
26. I can't avoid getting stressed.
27. It is easier to deal with my parents and family when I am less stressed.
28. I would be ashamed to seek help from others to manage my stress.
29. Others close to me suffer when I am stressed.
30. I'll find out that I can't manage my stress.
31. I feel better when I am less stressed.
32. I don't see any benefits to managing stress.
33. I feel healthier when I manage my stress.
34. Nobody notices a difference when I manage my stress

Appendix F

A Situational Confidence Measure for Stress Management Among Adolescents

Listed below are some situations in which it can be difficult to manage stress. How confident are you that you would be able to manage stress in these situations? Please answer using the following scale:

A = NOT AT ALL CONFIDENT
B = NOT VERY CONFIDENT
C = MODERATELY CONFIDENT
D = VERY CONFIDENT
E = EXTREMELY CONFIDENT

1. When things are not going the way I want.
2. When I have a difficult test or school assignment coming up.
3. When I am in poor health.
4. When I have an argument with a friend.
5. When I am frustrated.
6. When I need money.
7. When I am anxious.
8. When I am sick.
9. When I experience a serious personal crisis, such as an accident or death in the family.
10. When I think about the future.
11. When I am having difficulties breaking my bad habits.
12. When I argue with my parents.
13. When I am depressed.
14. When I don't have the freedom to do what I want.
15. When I have deadlines to meet.
16. When I am feeling lonely.
17. When I think about success.
18. When I do poorly on a test.
19. When my emotional needs are not being met.
20. When someone makes fun of me.
21. When I am tired.
22. When I am treated unfairly.
23. When I think about failure.
24. When I experience a personal problem.
25. When I am having difficulties with my work.
26. When I am feeling sad.
27. When I am having financial problems.
28. When I am forced to follow rules I don't agree with.
29. When I am not able to handle negative feelings.
30. When I don't know how to solve a personal problem.

Appendix G

A Process of Change Measure for Stress Management Among Adolescents

The following experiences can affect the way some people manage their stress. Think of any similar experiences you may be currently having or have had in the last month. Then rate the frequency of each event using the following scale:

A = NEVER
B = SELDOM
C = OCCASIONALLY
D = OFTEN
E = REPEATEDLY

1. I get upset when I see my parents ignoring the health hazards of stress.
2. I have someone I can talk to about problems in my personal life.
3. I feel good about myself when I manage stressful situations in school.
4. I look for information on adolescent stress.
5. I can expect more positive interactions with family and friends when I manage my stress.
6. I think that I cause other people in my life difficulty when I am stressed.
7. When I feel stressed, I try to talk about what's bothering me.
8. I tell myself that my stress is manageable.
9. I react emotionally when I am reminded how stress affects my life.
10. I notice that my friends are more aware of the need for stress management.
11. I look for ideas about how to manage my stress.
12. I have someone I can count on to support my decision to manage my stress.
13. When I start to feel stressed out, I take a short break to relax.
14. There are things or people at school that remind me to not get stressed.
15. I am proud of myself for having control over my stress.
16. It bothers me when friends cannot successfully manage their stress.
17. I find society changing in ways that make it easier for teenagers to manage stress.
18. I say or do something nice for myself when I manage my stress regularly.
19. I think that school would be better if more people managed their stress.
20. When the stress in my life disturbs me, I focus on the positive aspects of my life.
21. I think about how to manage the pressures from school.
22. I tell myself that I am able to manage the stress in my personal life.
23. I have someone who listens when I talk about the stress in my life.
24. I leave situations that make me feel stressed.
25. When I feel stressed I try to think of something or someone that helps me relax.
26. I worry about how my stress affects others around me.
27. I try to give myself enough study time, so that I won't feel stressed.
28. I notice that others are more aware of the need for stress management.
29. I feel good about myself when I manage my stress.
30. It is rewarding when I can deal with stress in a positive way.
31. Hearing about the risks of stress worries me.
32. I tell myself that I am able to manage the stress in school.
33. I know at least one person I can go to for advice on how to manage my stress.
34. If school is stressful, I like to do activities that will relax me.

35. I realize that people around me are trying to deal with their stress.
36. I feel I am a more confident person when I successfully manage my stress.
37. I am interested in ideas about how to manage my stress.
38. I get upset when my friends ignore the risks of getting stressed out.
39. I reward myself when I successfully manage the stress in my personal life.
40. I think that I can set a healthy example for my family by managing my stress.
41. I tell myself I am able to manage my stress.
42. I have someone who understands the stress I experience.
43. I feel good about myself when I manage stressful situations with my parents.
44. I see that stress management is really accepted by most people.
45. I keep reminders to think positively when I feel stressed.
46. I think about information on how to manage my stress.
47. Others reward or praise my choice to manage my stress.
48. I remind myself that I am able to manage stress at home.
49. I feel concern that my stress may be harming my loved ones.
50. I think about the good things in my life when my personal life gets stressful.
51. I avoid situations that I associate with increased feelings of stress.
52. I think about how I could manage my stress better.
53. It bothers me when people don't realize how stress can affect their lives.
54. My friends praise me when I manage my stress.
55. I realize that I can choose to deal with my stress.
56. I notice that managing stress is becoming a greater concern in school.
57. When I begin to feel stressed, I think about times I have coped successfully with stress.
58. I make commitments to manage my stress.
59. I feel good about myself when I manage stressful situations with my friends.
60. It upsets me to think about how the stress in my life can affect me.
61. I think that when I don't manage my stress it is also harmful to others.
62. I think about how to protect myself from future stresses.
63. I keep things at school that remind me to slow down and relax.
64. I have someone I can talk to about stressful situations at school .
65. I find that many people I know manage their stress in different ways.
66. I recall ideas people have given me on how to manage stress.
67. I am rewarded by others when I manage my stress.
68. I feel I can count on my family during stressful situations.
69. When I feel stressed I engage in some physical activity.
70. There are certain activities I do that relax me when I feel stressed.
71. I keep relaxing music with me to listen to when I feel stressed.
72. I remember information on teenage stress.
73. Hearing someone talk about the negative consequences of stress affects me emotionally.
74. I have friends I can talk to when I am stressed.
75. I think everyone would get along with me better if I managed my stress.
76. I can expect my life to improve when I manage my stress.
77. I consider the negative effects my stress has on my family and friends.
78. My family notices when I manage my stress well.
79. I consider how my life would improve if I could better manage my stress.
80. I keep things at home that remind me to relax and take a break.
81. I have someone I can trust when I need to talk about my stress.
82. I get upset when people ignore health warnings to avoid too much stress.
83. I remind myself that the stress in my life doesn't have to overwhelm me.

84. When I feel stressed out by homework, I take a short break to relax.
85. I get praised by my family when I can deal with my stress.
86. I have things in my bedroom that help me to relax.
87. I realize that being content with myself involves managing my stress.
88. I remind myself that there are healthy ways of dealing with my stress.
89. I notice that managing stress is becoming a greater concern in our society.
90. I have someone I can count on when I experience stress in my life.
91. I tell myself that I can choose to manage my stress.
92. I think that if people did more to manage their stress the world would be a better place.
93. When I feel overwhelmed by stress, I focus my attention on one problem at a time.
94. I am disappointed in myself when I let little things stress me out.
95. I realize that programs are available to help teenagers manage stress.
96. I think about information on stress management.
97. I consider that I can set a healthy example for my friends by managing my stress.
98. I feel I am a more responsible person when I manage my stress.
99. I get upset when I hear about someone getting sick from stress at school.
100. I notice stress being discussed more openly.

Appendix H

A Behavioral Outcome Measure for Stress Management Among Adolescents

The following activities and ideas are used by some people to manage their stress. Think about your own life in the last month. Rate the frequency of each activity using the following scale:

1 = NEVER
2 = SELDOM
3 = OCCASIONALLY
4 = OFTEN
5 = FREQUENTLY

1 I let other people know when they expect too much from me.
2 I make an effort to enjoy my life.
3 I try to say or do something funny if I feel tense.
4 I take care of my health.
5 I talk with close friends about important things in my life.
6 I have several different ways to relax.
7 I look for ways to make everyday events more fun.
8 I do something I enjoy doing at least one night a week.
9 I make efforts to organize my time effectively.
10 I engage in some exercise each week.
11 I tell myself to see the positive side of things.
12 I try to avoid pushing my body beyond its limits.
13 I exercise regularly to relieve my stress.
14 I spend time with friends at least once a week.
15 I tell myself I can meet daily challenges.
16 I try to look on the bright side even when something bad happens.
17 I have a regular schedule for exercise.
18 I say "no" to other people if I have to.
19 I prioritize what I need to do and focus on the important things.
20 I take quiet time for myself during the day.
21 I treat myself to something special after a long week.
22 I try to find the humor even in bad situations.
23 I think about the positive things in my life.
24 I seek out activities that are enjoyable to me.
25 I have someone to talk to about my daily problems.
26 I set aside some time each day for relaxation.
27 I do not let others interrupt special activities I have planned.
28 When I feel run down I get extra rest.
29 I take time to enjoy the good things in life.
30 I decide which tasks are most important to me.

Appendix I

Rhode Island Stress and Coping Inventory

In the last month, how often was each of the following statements true of your own life? Please rate the frequency using the following scale:

1 = NEVER
2 = SELDOM
3 = OCCASIONALLY
4 = OFTEN
5 = REPEATEDLY

1. I was able to cope with difficult situations.
2. I felt overwhelmed.
3. I was able to cope with unexpected problems.
4. I felt stressed by unexpected events.
5. I successfully solved problems that came up.
6. I felt I had more stress than usual.
7. I felt able to cope with stress.
8. I felt there was not enough time to complete my daily tasks.
9. I felt able to meet demands.
10. I was pressured by others.

Bibliography

Anderson, B. L., Kiecolt-Glaser, J. K., & Glaser, R. (1994). A biobehavioral model of cancer stress and disease course. American Psychologist,49, 389-404.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. Psychological review,84(2), 191-215.

Bentler, P. M. (1990). Comparative fit indexes in structural models. Psychological bulletin, 107, 238-246.

Cannon, W. B. (1929). Bodily changes in pain, hunger, fear, and rage. Boston: CT Branford.

Cohen, S., Frank, E., Doyle, W. J., Skoner, D. P., Rabin, B. S., & Gwaltney, J. M. (1998). Types of stressors that increase susceptibility to the common cold in healthy adults. Health Psychology,17, 214-223.

Connor-Smith, J. K., Compas, B. E., Wadsworth, M. E., Thomsen, A. H., & Saltzman, H. (2000). Responses to stress in adolescence: Measurement of coping and involuntary stress responses. Journal of Consulting and Clinical Psychology,68, 976-992.

Cooper, C. L., & Faragher, E. B. (1993). Psychosocial stress and breast cancer: The inter-relationship between stress events, coping strategies and personality. Psychological Medicine,23, 653-662.

Copeland, E. P. & Hess, R. S. (1995). Differences in young adolescents' coping strategies based on gender and ethnicity. Journal of Early Adolescene,15, 203-219.

DeLongis, A., Folkman, S., & Lazarus, R. S. (1988). The impact of daily stress on health and mood: Psychological and social resources as mediators. Journal of Personality and Social Psychology, 54, 486-495.

DiClemente, C. C., Prochaska, J. O., & Gibertini, M. (1985). Self-efficacy and the stages of self-change in smoking. Cognitive therapy and research, 9(2), 181-200.

DiClemente, C. C., Prochaska, J. O., Fairhurst, S., Velicer, W. F., Rossi, J. S., & Velasquez, M. (1991). The process of smoking cessation: An analysis of precontemplation, contemplation, and contemplation/action. Journal of Consulting and Clinical Psychology,59, 295-304.

Dumont, M. & Provost, M. A. (1999). Resilience in adolescents: Protective role of social support, coping strategies, self-esteem, and social activities on experience of stress and depression. Journal of Youth and Adolescence, 28, 343-363.

Evers, K. E., Evans, J. L., Fava, J. L., & Prochaska, J. O. (2000). Development and validation of transtheoretical model variables applied to stress management. Annals of Behavioral Medicine,22(supplement), 39.

Fava, J. L., Norman, G. L., Levesque, D. A., Redding, C. A., Johnson, S., Evers, K., & Reich, T. (1998). Measuring decisional balance for stress management. Annals of Behavioral Medicine,20,(supplement), 195.

Fava, J. L., Norman, G. J., Redding, C. A., Levesque D. A., Evers, K. & Johnson, S. (1998). A processes of change measure for stress management. Annals of Behavioral Medicine,20 (supplement), 195.

Fava, J. L., Robbins, M. L., Redding, C. A., Norman, G. L., Keller, S., Evers, K. E., & Maddock, J. E., (2000). A comparison of two algorithms for the Stages of Change for stress management. Annals of Behavioral Medicine,22(supplement), 13.

Fava, J. L., Ruggieo, L., & Grimley, D. (1998). Development and confirmation of the Rhode Island Stress and Coping Inventory. Journal of Behavioral Medicine,21, 601-611.

Frydenberg, E. & Lewis, R. (1993). Boys play sports and girls turn to others: Age, gender, and ethnicity as determinants of coping. Journal of Adolescence,16, 253-266.

Galavotti, C., Cabral, R. J., Lansky, A., Grimley, D. M., Riley, G. E., & Prochaska, J. O. (1995). Validation of measures of condom and other contraceptive use among women at high risk for HIV infection and unintended pregnancy. Health Psychology,14, 570-578.

Greenberg, J. S., (1993). Comprehensive Stress Management (4th ed.). Dubuque, IA: Wm. C. Brown Communications, Inc.

Greene, J. W., Walker, L. S., Hickson, G., & Thompson, J. (1985). Stressful life events and somatic complaints in adolescents. Pediatrics, 75, 19-22.

Greene, J. W., & Walker, L. S. (1997). Psychosomatic problems and stress in adolescence. Adolescent Medicine, 44,1557-1572.

Grimley, D., Prochaska, J. O., Velicer, W. F., Blais, L. M., & DiClemente, C. C. (1994). The transtheoretical model of change. In T. M. Brinthaupt and R. P. Lipka (Eds.), Changing the self: Philosophies, techniques, and experiences (pp.201-227). Albany, NY: State University of New York Press.

Holmes, T. H., & Rahe, R. H. (1967). The Social Readjustment Rating Scale. Journal of Psychosomatic Research,11, 213-218.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. Psychometrika,30, 179-185.

Janis, I. L., & Mann, L. (1977). Decision making: A psychological analysis of conflict, choice, and commitment. New York: Free Press.

Kemeny, M. E., Cohen, F., Zegans, L. S., & Conant, M. A. (1989). Psychological and immunological predictors of genital herpes recurrence. Psychosomatic Medicine,51, 195-208.

Klink, Jac J. L., Blonk, R. W. B., Schene, A. H., & Dijk, J. H. (2001). The benefits of interventions for work-related stress. American Journal of Public Health,91, 270-276.

Lacks, P., & Morin, C. M. (1992). Recent advances in the assessment and treatment of insomnia. Journal of Consulting and Clinical Psychology,60, 586-594.

Lohman, B. J., & Jarvis, P. A. (2000). Adolescent stressors, coping strategies, and psychological health studied in the family context. Journal of Youth and Adolescence, 29, 15-43.

Natvig, G. K., Albrektsen, G., Anderseen, N., & Quarnstrom, U. (1999). School-related stress and psychosomatic symptoms among school adoilescents. Journal of School Health, 69, 362-368.

Norman, G, J., Fava, J. L., Levesque, D. A., Redding, C. A., Johnson, S., Ever, K., Reich, T. (1997). An inventory for measuring confidence to manage stress. Annals of Behavioral Medicine,19 (supplement), 78.

Northwestern National Life Insurance Company. (1991). Employee burnout: America's newest epidemic. Minneapolis, Minnesota: Northwestern National Life Insurance Company.

Prochaska, J. O. & DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model of change. Journal of Consulting and Clinical Psychology,51, 390-395.

Prochaska, J. O. & DiClemente, C. C. (1984). The Transtheoretical Approach: Crossing traditional boundaries of change. Homewood, IL: Dow Jones/Irwin, Inc.

Prochaska, J. O., Velicer, W. F., DiClemente, C. C., & Fava, J. L. (1988). Measuring the processes change: Applications to the cessation of smoking. Journal of Consulting and Clinical Psychology,56, 520-528.

Prochaska, J. O., Velicer, W. F., DiClemente, C. C., Guadagnoli, E., & Rossi, J. (1991). Patterns of change: A dynamic typology applied to smoking cessation. Multivariate Behavioral Research,26, 83-107.

Prochaska, J. O., DiClemente, C. C., & Norcross, J. C. (1992). In search of how people change: Applications to addictive behaviors. American Psychologist,47, 1102-1114.

Prochaska, J. O. (1994). Strong and weak principles for progressing from Precontemplation to Action based on twelve problem behaviors. Health Psychology,13, 47-51.

Prochaska, J. O., Velicer, W. F., Rossi, J. S., Goldstein, M. G., Marcus, B. H., Rakowski, W., Fiore, C., Harlow, L. L., Redding, C. A., Rosenbloom, D., & Rossi, S.

R. (1994). Stages of change and decisional balance for twelve problem behaviors. Health Psychology,13, 39-46.

Riley, T. A., Toth, J. M., & Fava, J. L. (2000). The Transtheoretical model and stress management practices in women at risk for, or infected with , HIV. Journal of the Association of Nurses in AIDS Care, 11, 67-77.

Robbins, M. L., Fava, J. L., Norman, G. J., Velicer, W. F., Redding, C., & Levesque, D. B. (1998). Stages of change for stress management in three samples. Annals of Behavioral Medicine,20 (supplement), 99.

Rossi, J. S. & Redding, C. A. (2001). Structure and function of self-efficacy across the stages of change for 10 health behaviors. Annals of Behavioral Medicine,23 (supplement), 94.

Shilling, S., & Brackbill, R. M. (1987). Occupational health and safety risks and potential health consequences perceived by US workers. Public Health Report, 102, 36-46.

Swearingen, E. M. & Cohen, L. H. (1985). Life events and psychological distress: A prospective study of young adolescents. Developmental Psychology,21, 1045-1054.

Velicer, W. F. (1976). Determining the number of components from the matrix of partial correlations. Psychometrika,41, 321-327.

Velicer, W. F., DiClemente, C. C., Prochaska, J. O., & Brandenberg, N. (1985). A decisional balance measure for assessing and predicting smoking status. Journal of Personality and Social Psychology,48, 1279-1289.

Velicer, W. F., DiClemente, C. C., Rossi, J. S., & Prochaska, J. O. (1990). Relapse situations and self-efficacy: An integrative model. Addictive Behaviors,15, 271-283.

Velicer, W. F., Prochaska, J. O., DiClemente, C. C., & Brandenburg, N. (1985). Decisional balance measure for assessing and predicting smoking status. Journal of Personality and Social Psychology, 48, 1279-1289.

Velicer, W. F., Prochaska, J. O., Fava, J. L., Norman, G. L., & Redding, C. A. (1998). Smoking cessation and stress management: Applications of the transtheoretical model of behavior change.Homeostasis,38, 216-233.

Woolfolk, R. L., & Lehrer, P. M. (Eds.). (1984). Principles and Practice of Stress Management. New York: The Guilford Press.